THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

OLD SERIES
VOL. 15, No. 6.

NEW YORK, JUNE, 1909.

NEW SERIES
VOL. 7, No. 6.

THE CINCINNATI CONVENTION OF FOUNDRYMEN AND MANUFACTURERS
MAY 17—22, 1909.

The week of May 17-22, 1909, witnessed the most successful convention of associations devoted to the foundry and allied industries that was ever held. The occasion was the fourteenth annual convention of the American Foundrymen's Association and the third of the American Brass Founders' Association. With these met the American Foundry Foremen and the Foundry and Manufacturers' Supply Association, which latter organization furnished the star attraction in the shape of their exhibit of foundry machinery and appliances, supplies, etc.

The American Foundrymen's Association and the American Brass Foundrymen's Association held joint sessions which, while being a vast improvement in point of attendance over the meetings held in Toronto last year, it seems probable that both separate and joint sessions will be held next year. The convention was remarkably well attended, there being a registration of over 1,800 and a total attendance probably of over 2,500. The meetings were on the whole well attended and aside from one or two unforeseen incidents, were very successful.

Owing to the fact that the lecture hall in which the meetings were held was directly over the exhibition rooms, the roar and jar of machinery was so manifest as to seriously interfere with the reading of papers. The Cincinnati Fire Prevention Bureau assumed an obstinate attitude which resulted in preventing the use of a moving picture machine. This detracted materially from the interest of some of the papers read, as it had been proposed to illustrate them by moving pictures.

THE CONVENTION BADGE.

The opening meeting held on the afternoon of Tuesday, May 18, was a joint session of the American Foundrymen's Association and the American Brass Founders' Association, and was called to order by the president of the former, L. L. Anthes, of the Toronto Foundry Company, Toronto, Canada, who read the annual address.

W. R. Webster, Bridgeport, Conn., vice-president of the Brass Founders' Association, delivered the annual address of that organization in the absence, through illness, of the president, C. J. Caley, of New Britain, Conn.

THE PRESIDENT'S ADDRESS.

The American Brass Founders' Association was founded because of a conviction that the enormous benefits to the arts connected with the founding of cast iron, which had been brought about by our parent society, the American Foundrymen's Association, could be paralleled in the arts more or less directly connected with the founding of the non-ferrous metals and their alloys.

It is primarily the function of an association such as this to enlarge and extend knowledge of the natural laws upon which is based the practice of the arts to which we are devoted, to the end that our methods may thereby become more efficient and precise. It is no longer necessary to argue concerning the necessity of the application of scientific methods in this connection if the best results are to be secured. We need concern ourselves only with the ways of most certainly accomplishing a proper union of the knowledge and methods of the laboratory with the knowledge and methods of our industrial practice.

To such an extent has the advantage of organized association in connection with the progress of industry become demonstrated both in this country and abroad, that it may well be held to be one of the foremost influences in producing processes, and backward indeed is the industry which does not, or cannot, derive marked benefit from such a course.

This movement has been founded upon the procedure of the great learned societies, institutions which extend backward to the beginning of modern science, as we know it. In general the method consists of the publication at stated times of papers upon related subjects and of discussions concerning them.

In following out this practice it becomes necessary that at our annual conventions we should have presented to us papers on subjects needful to our work. Upon the value of the knowledge imparted by these papers, and the discussions which result will depend the magnitude of the influence which we exert. It should, therefore, be our chief aim to so stimulate our members that those who possess special knowledge may be led to impart it. It has been held that special knowledge of industrial importance cannot properly be imparted freely, but held for the benefit of its possessor. There are many instances in which this is unquestionably so. It should, however, be recognized that we are primarily associated for the

purpose of receiving knowledge and that in order to do so it is but fair that in so far as we are able, we should likewise impart it. This is not impossible with all due regard to matters of commercial advantage. Experience has proven that those who have most fear of imparting knowledge are usually in most need of it. It is well in this connection to imagine what would be the condition of our civilization, industrial and other, if acquired knowledge had perished with its original possessors. On the other hand, we may well remember that our own axioms are often our neighbors' problems.

In no way, then, can we more certainly insure the progress of this organization than by the use of proper means of obtaining the presentation of papers by our members. This matter should constitute a part of the duty of the Committee on Papers. This committee should make inquiry among the membership as to what subjects are of current interest and importance and invite papers from those especially qualified to elucidate them. Such a committee could properly secure the co-operation of the technical schools.

Not the least of the functions which we should exercise should be the provision of proper criticism and discussion in order to secure the correction, in so far as possible, of such information as is laid before us. Such criticism and discussion when prompted by proper motives makes for accuracy and efficiency. There are many other matters in furtherance of the work of this association which should properly be intrusted to standing or permanent committees, such as the establishment of proper standards of various kinds, as may from time to time appear necessary or desirable. Experience will determine the scope of this work.

Not the least of the advantages incident to our association, it should be mentioned, are those which are to be enjoyed by attendance at the annual conventions. While the opportunities thus afforded to make and enlarge acquaintanceship and to broaden the view by study of the exhibits are alone of great value, these meetings make it possible to procure much valuable information and assistance by personal interchange of experience and data.

Let us therefore earnestly strive to make this association a vital factor in the industrial progress of this country, by each in his own line adding to the available knowledge of the arts connected with the useful employment of the non-ferrous metals through the instrumentality of the American Brass Founders' Association.

The secretary, W. M. Corse of Detroit, Michigan, then presented his report on membership and financial conditions.

THE SECRETARY'S REPORT.

The membership reported at the last meeting in Toronto was 145, from which number we have lost by death 1 and by resignation 11. We have added 73 new members to our list during the year, making a net gain of 61, equivalent to 42 per cent. The arrangements with the American Foundrymen's Association whereby the Transactions of both associations were furnished to our members and to theirs gave our members something tangible in the way of returns for their membership. It is hoped that each member will bind his Transactions as a reference book. Extra copies of the individual papers may be obtained from the secretary on request as long as the supply lasts.

I am pleased to announce in this connection that arrangements have been completed whereby our association has the right to use the metallurgical abstracts from the Abstract Journal of the American Chemical Society in our Transactions next year. This journal, as you know, is the most complete abstract journal printed in English, and the use of those portions that are of interest to our members should add greatly to the value of our Transactions. This means also that interesting information will be distributed throughout the year instead of just at convention time. The American Foundrymen's Association has published foundry news before, but the labor involved was more than a secretary could give to it. This new arrangement ought to obviate these difficulties.

The suggestion was made during the year that our association appoint a committee at this meeting to compile standard methods of analysis for brass and kindred alloys. Similar work by the American Foundrymen's Association produced very valuable results, and I would recommend, therefore, that action be taken at this time with that end in view. The United States Bureau of Standards have signified their intention to co-operate with us, and the standing committee of the American Chemical Society on "Standard Methods of Analysis" will also be glad to help. I have written to chemists throughout the country and many have signified their willingness to aid the movement. The Government and the American Chemical Society will each have a representative in attendance for two days this week, if necessary, to consult with any committee that we may appoint.

FOUR OF THE LEADING SPIRITS.

DR. RICHARD MOLDENKE, Secretary A. F. A. | A. L. ANTHES, Ex-President A. F. A. | W. R. WEBSTER, President A. B. F. A. | WM. M. CORSE, Secretary-Treasurer A. B. F. A.

I am pleased to report that several members during the year have made use of the secretary's office to obtain information regarding foundry practice, and it is hoped that this number will be largely increased this coming year. The report of receipts and expenditures given in a little more detail than in the treasurer's report may be of interest. It is as follows:

Balance on hand reported at Toronto	$245.00
Received from dues	797.50
	$1,042.64
Expenses:	
Express, freight and cartage	$7.07
Stenographer at Toronto	12.60
Office supplies	20.63
Salary of Secretary A. M. Fairlee (balance)	100.00
Salary of Secretary W. M. Corse	300.00
Printing and multi-typewriting	361.01
Postage	94.03
Sundries	29.30
Loan of American Foundrymen's Association	100.00
	$1,024.64
Balance on hand	$18.00

Since the report of the treasurer was made out there have been received from dues $130, which makes a balance on hand at this meeting of $148. The gratifying increase in the membership during the year goes to prove the value of the association, and also shows that the model after which we patterned our organization, viz., The American Foundrymen's Association, was a safe one to copy and to emulate.

ELECTION OF OFFICERS A. F. A.

The following were elected to serve during the ensuing year for the American Foundrymen's Association:

President, Arthur T. Waterfall, Detroit; secretary-treasurer, Dr. Richard Moldenke, New Jersey; vice-presidents, F. B. Farnsworth, New Haven, Conn.; Walter Wood, Philadelphia, Pa.; Joseph T. Speer, Pittsburg, Pa.; William Gilbert, Cincinnati; E. W. Smith, Chicago, Ill.; J. W. Sheriff, Milwaukee, Wis.; A. E. Howell, Nashville, Tenn.; A. F. Clare, Preston, Ont.

ELECTION OF OFFICERS A. B. F. A.

The annual business meeting of the American Brass Founders' Association was held Wednesday afternoon, May 19. The nominating committee consisted of Dr. F. T. F. Stephenson, consulting chemist, Detroit; A. L. Haasis, Dixon Crucible Company, Jersey City, N. J.; F. A. Coleman, J. D. Smith Foundry Supply Company, Cleveland, Ohio; J. J. Wilson, Cadillac Motor Company, Detroit; A. P. Ford, Crane Valve Company, Bridgeport, Conn. The report was presented by Dr. Stephenson, and on his motion the following were elected officers for the coming year:

President, W. R. Webster, Bridgeport, Conn.; secretary and treasurer, Wm. M. Corse of Detroit, Mich.; the office of treasurer being consolidated with that of secretary. The vice-presidents and their respective districts are as follows: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut District, Edward O. Goss, Scoville Manufacturing Company, Waterbury, Conn. (rolling mills). A. H. Warner, Stebbins Manufacturing Company, Springfield, Mass (foundries). Ohio, Michigan and Indiana District, L. W. Olsen, Ohio Brass Company, Mansfield, Ohio; New York and New Jersey, W. L. Abate, general superintendent Nathan Manufacturing Company, 416 East 106th street, New York, N. Y.; Pennsylvania, Delaware, Maryland and District Columbia, Thomas Evans, Eynon-Evans Manufacturing Company, Philadelphia, Pa.; Illinois (except City of Chicago), Missouri, Kansas, Colorado, New Mexico, Utah, Arizona, Nevada, California, J. N. Gamble, National Tube Company, Kewanee Works, Kewanee, Ill.; City of Chicago, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Idaho, Nebraska, Montana, Wyoming, Washington, Oregon, W. D. Allen, W. D. Allen Manufacturing Company, Chicago, Ill.; Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Indian Territory, Texas, Kentucky, Tennessee, J. Cessna Sharp, John C. Sharp Brass Works, Chattanooga, Tenn.; Ontario and Western Provinces, Canada,

FOUR OF THE VICE-PRESIDENTS, A. B. F. A.

W. L. ABATE.

J. CESSNA SHARP.

N. K. B. PATCH.

J. N. GAMBLE.

N. K. B. Patch, Lumen Bearing Company, Toronto, Canada; Quebec and Maritime Provinces, Canada, Richard R. Mitchell, The Robert Mitchell Company, Limited, Montreal, Canada. A committee was appointed by President Webster to compile standard methods for the analysis of brass and kindred alloys. This committee, which will act in unison with Dr. W. F. Hillebrand of the United States Bureau of Standards, of the Department of Commerce and Labor, is composed of Wm. M. Corse, metallurgist for the Michigan Smelting and Refining Company, Detroit, Michigan; E. R. Sperry, Bridgeport, Conn.; Arthur D. Little, paper mill expert, of Boston, Mass.; Dr. F. T. F. Stephenson, consulting chemist, of Detroit, Mich., and L. J. Krom, metallurgist, of New York.

The following officers were elected for the American Association of Foundry Foremen: President, E. H. Smith, of Chicago; first vice-president, W. F. Grunan, Erie, Pa.; second vice-president, I. C. Marshall, of Milwaukee; secretary-treasurer, C. E. Hoyt, of Chicago.

At the meeting resolutions were passed expressing regret for the illness of C. J. Caley of New Britain, Conn., the retiring president, which prevented him from attending the convention.

THE CONEY ISLAND EXCURSION.

One of the most notable features of the convention was the excursion given to the visitors and their friends by the City of Cincinnati. The only unpleasant thing about the whole week was that the rain spoiled much of the fun on the day provided for the outing. But though it rained all day there were some 750 who went on the boat trip on the Island Queen. First the visitors were taken down the river to get a view of the water line of the city, and then the start was made for Coney Island. A novelty was sprung just as the boat started, and while the mass of people were coming up the steps to the main saloon. The J. D. Smith Foundry Supply Company, of Cleveland, had prepared thousands of red, blue and green feathers on which their name had been printed. On the quill of each feather was fastened a burr, and these were thrown at the people, the burr sticking to the clothes, hats, hair, etc., of the people. It created considerable excitement and amusement. Not one person showed a white feather. Landing at the grounds the people marched up the walks through the rain, but everyone was happy. They were first served with burgoo and mint juleps, as well as other beverages, and then engaged in ringing canes, throwing baseballs and other forms of light amusement.

At 6 o'clock the boat started back for the city, having abandoned a further trip up the river as had been planned, on account of the weather. On the return, coffee and sandwiches were served in abundance, while dancing was enjoyed in the main saloon.

CONVENTION PERSONALS.

Lacrosse Player Coleman put in a little practice by making some wild throws of burdock burrs, and then recuperating with burgoo julep.

Baltimore Smile Harvey and Blue Chip Steele were ever ready to give points on melting brass.

Wanted a voice.—W. S. Quigley, after the convention.

The Convention swing walk.—Mr. Molding Machine Mumford.

"The smile that would not come off" was worn by W. L. Abate whenever anyone had a word to say on brass furnaces.

Matthew 'arvey Goyne and his game man Alf delivered furnace logic, Merry England style.

The military end of the show was under the command of Colonel Bleyer and his aides, Captain Ringer and Lieutenant Cliff.

Dignity by the yard was dealt out by Wm. R. Webster of the Nutmeg State. Naugatuck Valley traditions upheld.

The learned Reidenbach was on hand with a goodly number of ideas and suggestions.

Art Collector Haasis and Rolling Mill Bill were very fond of escorting foundrymen to the water tank.

Have one on you.—Edwinn Berliner.

An Ohio River Burgoo Songster—Peter Kroeschell.

A man with a voice—W. M. Corse.

Bewhiskered activity, geniality, glad handily—Doctor Moldenke.

Everywhere, anywhere on the job—Hoyt.

The Convention Queen—Mrs. Moldenke, with a record of ten.

THE PAPERS.

In the pages following we publish four of the papers read at the meeting of the American Brass Founders' Association, together with the discussions thereon. One paper in particular, "Melting Turnings in the Oil Furnace," aroused considerable interest, and the discussion resolved itself into a sort of exposition on the various kinds of furnaces. This subject we hope to enlarge upon in more detail in a future issue of THE METAL INDUSTRY.

DETROIT, 1910.

The convention adjourned to meet in Detroit in 1910, probably the first week in June.

SCARCITY OF PLATINUM.

Platinum is chiefly mined in the Ural Mountains, and Russia supplies 95 per cent. of the entire world's production. Never before has the output of the mineral sunk to so low a figure; in 1908 only about 4 tons 16 hundredweight was mined. The production has been falling off steadily since 1901, when it amounted to 6 tons 5 hundredweight.

The reason for this shrinkage is not because the platinum mines are becoming exhausted, but because the owners have formed a combination with the object of restricting the output and thus forcing the price up. For this same reason new borings have not been made for a considerable time.

Although a scarcity of platinum would not affect industry in general very much, it is of grave importance to the scientific world, and the hope is expressed by many scientists that platinum deposits may be discovered elsewhere, so that the production may no longer remain dependent on the plans of a small number of Russian mining magnates.

MOLYBDENUM.

Molybdenum is used in this country for the following purposes: In the form of molybdate of ammonia as a chemical reagent for the determination of phosphoric acid; in the preparation of "blue carmine" for coloring porcelain; in the preparation of fireproofing material; as a germicide on the cloth used in railway passenger coaches, and in the form of ferro-molybdenum for making high-speed tool steels. The value of molybdenum ores varies from $230 to $430 per ton according to the amount of molybdenum they may contain. In 1903 the production in the United States was 795 short tons worth $60,865, but in 1904 it was only 14 tons and in 1905 but 15 tons. The sources of supply are chiefly the Western States. The Crown Point Mining Company, Seattle, Washington; the American Molybdenum Company, Cooper, Maine; Leslie Copper Mining Company, Montana, are among the producers of molybdenum ores. There are a number of small producers in Utah, Arizona, Skagway, Alaska and other localities.

THE EXHIBITION OF THE FOUNDRY AND MANUFACTURERS SUPPLY ASSOCIATION.

With the election of officers of the Foundry and Manufacturers Supply Association and the passing of resolutions which will dispense with souvenirs at the next convention of the allied associations in Detroit, May 30 to June 4, 1910, the elimination of the charge of $5 for extra representation of firms and extending a vote of hearty thanks and commendation to Cincinnati for the entertainment and courtesy offered the visitors, the last official meeting of the big gathering came to a close.

The meeting was held Friday evening, May 21, 1909, at the Sinton Hotel, where over a hundred of the members were gathered. Twenty-two new members were enrolled, bringing the total membership up to 105. Reports of the president, secretary and treasurer carried the sense of the association as being in the best of condition, the financial report showing over $6,000 in excess of all expenses in connection with its division.

The nominating committee, consisting of H. Frohman, Cincinnati, Ohio; Frederick B. Stevens, Detroit, Mich.; R. Buch, Elizabethtown, Pa.; M. E. Kanavel, Cleveland, Ohio, and H. C. Pridmore, Chicago, Ill., brought in their report, and the following were elected as officers for the ensuing year:

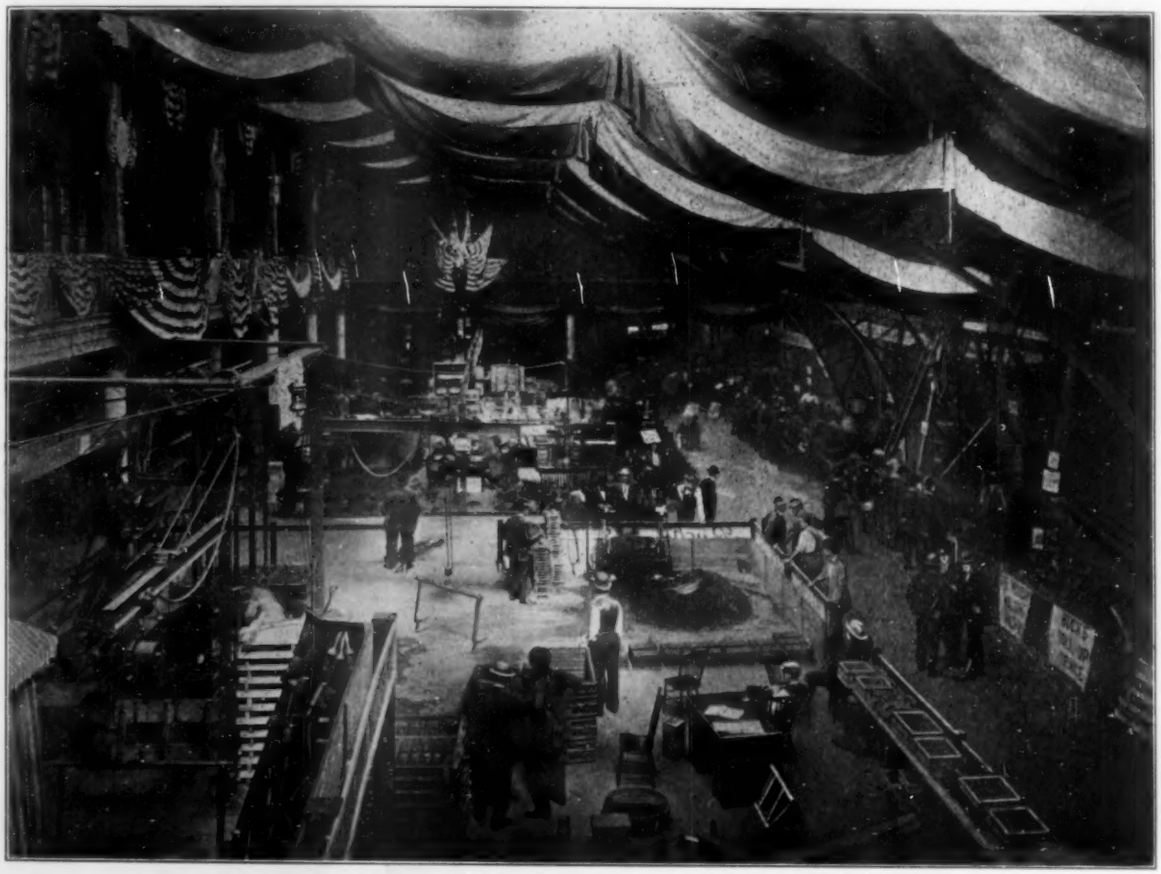
F. N. Perkins of the Arcade Manufacturing Company, Freeport, Ill., president; Frederick B. Stevens of Detroit, first vice-president; R. S. Buch of A. Buch's Sons Company, Elizabethtown, Pa., second vice-president; S. T. Johnston of S. Obermayer & Co., Chicago, third vice-president; William Lodge of Lodge & Shipley Machine Company, Cincinnati, fourth vice-president.

Trustees for three years are E. A. Pridmore, Chicago; George H. Wadsworth, Cuyahoga Falls, Ohio, and H. R. Atwater of Cleveland. E. J. Woodison of Detroit was selected to fill out the unexpired term of S. T. Johnston.

C. E. Hoyt of the Lewis Institute, Chicago, was re-elected secretary, and J. S. McCormick of Pittsburg was chosen as treasurer.

THE EXHIBITS.

Machinery Hall, together with the temporary building erected in the rear, cuts of which we show, was comfortably filled with the exhibits, which covered practically every phase of the foundry business. The exhibits numbered 70, which was identical with the Philadelphia meeting two years ago and 3 more than at the Toronto meeting last year. The weight of shipments from out-of-town exhibition amounted to 368,000 pounds, this being exclusive of generators, air compressors, motors, etc., furnished by courtesy of local manufacturers. Two carloads of molding sand were used in the main hall, and several tons of metal were melted and poured in the furnaces in the temporary building.



VIEW OF THE EXHIBITION HALL.

The installation for power which was used in both buildings consisted of one 80, seven 10, one 7½, one 6½, two 5, one 3, one 2 and one 1 h. p. direct connected type

K motors furnished by Allis-Chalmers Company. Compressed air was furnished by a compressor of the Chicago Pneumatic Tool Company. The pressure was 80 lbs. developing 427 cu. ft. per minute.

A number of entirely new devices were shown, and operated at stated intervals during the day, and were the cause of much interest. One very gratifying result of the exhibition was the amount of business done and interest shown by visitors, there being none of the idle curiosity so common to displays of this character. Every one seemed to be thoroughly in earnest and a good many profitable business connections were formulated. Taking the results of this convention and exhibition as an index of business conditions, it is very evident that the affairs of the country are in a very satisfactory state and that it will be only a short time before the wheels of industry are turning faster than before.

VIEW OF THE TEMPORARY BUILDING, SHOWING FURNACE DISPLAY.

The list of the exhibitors and their displays follows:

THE EXHIBITORS.

AMERICAN SMELTING AND REFINING COMPANY, Cincinnati, Ohio.—A fine line of brass, copper, tin, lead, spelter, babbitt metal, etc., was shown by Harvey Cautor, who reported many sales and many inquiries which means good future business.

THE ALLYNE BRASS FOUNDRY COMPANY, Cleveland, Ohio.—C. P. Mebane was on hand to tell visitors the merits of a new material called "Homogen," used in connection with the melting of brass. Great things are claimed for this new material, which excited considerable interest among the visiting brass foundrymen.

ARCADE MANUFACTURING COMPANY, Freeport, Ill.—The whole official and selling force of this company was at their exhibit explaining the merits of their molding machines. E. H. Morgan, the president of the company, said he was delighted at the results obtained, and had never seen so much interest displayed at one of these meetings. He thinks that next year's meeting will be even greater than this one, which far surpassed any previous one. They booked many orders during the meeting.

BAIRD & WEST, Detroit, Mich., reported a fine business in solvay coke, and that they were well pleased with the exhibition.

OSCAR BARNETT FOUNDRY COMPANY, Harrison, N. J.—This firm reported good business and great interest in their line of standard interchangeable flasks. Every type for every kind of machine could be seen here. Mr. Barnett went home with some good orders.

JONATHAN BARTLEY CRUCIBLE COMPANY, Trenton, N. J.—Mr. Bartley reported a number of good sales, and said he thought this was the best exhibition ever held, and he was particularly well pleased with results. They gave out a specially handsome little souvenir made in the shape of a crucible.

BERKSHIRE MANUFACTURING COMPANY, Cleveland, Ohio.—J. N. Bettenfeld, in charge here, said they had booked many orders for their well-known molding machines. These machines were in operation almost continuously, and drew large crowds. Aside from the many orders, he reports inquiries large and the interest and business better than the last two meetings combined.

A. BIRKENSTEIN & SONS COMPANY, Chicago, Ill.—Represented by S. M. Bush, J. B. Neiman and E. E. Berliner, all of whom lost their voices in selling metals. They had a fine display of metals on hand of copper, brass, tin, bronze compositions, babbitt, solder, aluminum and nickel, as well as a line of Taunton Crucible Company's crucibles, for which they are agents. A. J. McCormick, the vice-president and manager of the last named company, was also in attendance.

BROWN SPECIALTY MACHINERY COMPANY, Chicago, Ill.—Here Elmer Rich, Jr., took pleasure in showing the hammer core making machine, core cabinet, and something new in diamond pattern lumber. Mr. Rich felt well repaid for his efforts in the great interest shown by exhibitors and the amount of business done.

BROWNING ENGINEERING COMPANY, Cleveland, Ohio.—H. E. Green explained to the visitors a fine line of electric and hand power cranes, Remington electric hoists, locomotive cranes, magnets, buckets, etc. He said he was greatly surprised at the interest shown in his line, which looks well for business from foundrymen.

A. BUCH'S SONS, Elizabethtown, Pa.—This company exhibited a monster gravity molding machine which drew large crowds and excited much comment. Also various other kinds of molding machines. These people said they were specially well pleased with the interest manifested in their display. They took some good orders home with them.

BURROUGHS ADDING MACHINE COMPANY, Detroit, Mich.—An interesting exhibit was the adding and calculating machine made by this company. They reported considerable interest shown in their exhibit.

THE CALUMET ENGINEERING WORKS, Harvey, Ill., displayed a model of their Calumet Cupalo, which attracted much attention. The attendants were much pleased with the reception accorded their exhibit.

THE CARBORUNDUM COMPANY, Niagara Falls, N. Y.—George R. Raynor said he was well pleased with the interest shown in their exhibit, which was composed of carborundum in its raw state and every conceivable form in which it is manufactured. Stick pins of carborundum were presented to visitors.

CENTRAL FOUNDRY SUPPLY COMPANY, Columbus, Ohio.—J. T. Ball and Wm. Feuton were busy handing out or mailing samples of their acme parting. They reported a good business, and that they were well pleased with the results attained.

CLEVELAND WIRE SPRING COMPANY, Cleveland, Ohio.—J. W. Campbell was showing a specially attractive line of steel barrels on wheels for handling small castings, which are unbreakable, and can be used to advantage in the machine room, polishing and plating rooms. Also cake boxes, sheet metal specialties and wire springs. Mr. Campbell booked some nice orders, and reported great interest in his line.

GEO. E. CRIVEL & COMPANY, Buffalo, N. Y., reported that they were pleased with the exhibition, and surprised at interest taken by visitors in their line of foundry supplies. Mr. Crivel was in attendance.

CURTIS & CO. MFG. COMPANY, St. Louis, Mo.—E. M. Steedman was kept busy showing the merits of their new sand blast. He reported a number of orders secured and much interest shown by visitors. Together with the E. H. Mumford Company of Philadelphia, they had on exhibition one of the Curtiss-Mumford overhead molders used in connection with jolt machine for floor work to roll over and draw patterns. This machine is a monster, and created considerable interest. The molding machine used in this connection was one of large proportions just brought out by the Arcade Mfg. Company of Freeport, Ill., quite a number of which have already been sold.

DIAMOND CLAMP AND FLASK COMPANY, Richmond, Ind.—Mr. E. Gaetsid, the head of this firm, with a corps of assistants, explained to interested visitors the Diamond line of core making machines, patternmakers, chucks, flasks, bench trimmers, etc., and reported many sales and a large number of inquiries for future business.

JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.—Dudley Johnson, the Chicago manager of this company, was in charge with a large corps of assistants. He said he was surprised with the results attained, so far as they were concerned. This company gave out interesting souvenirs, such as fly stick pins, candle pyrometers, lead pencils that would write and some that would not, etc.

DETROIT FOUNDRY SUPPLY COMPANY, Detroit, Mich.—"Rest thy weary bones" was one of the signs displayed over some inviting chairs as an attraction to the tired but happy throng by the Detroit Foundry Supply Company of Detroit, Mich. This firm had many of the small things needed in the foundry on exhibition, and the two genial boys, E. J. Woodison and W. B. Howard, were kept busy shaking hands with old friends and meeting new ones for their superior line of goods. This firm recently bought out the business of the Detroit Polishers and Platers Supply Company, manufacturers of goods for polishers and platers, and are now ready to talk business along this line also.

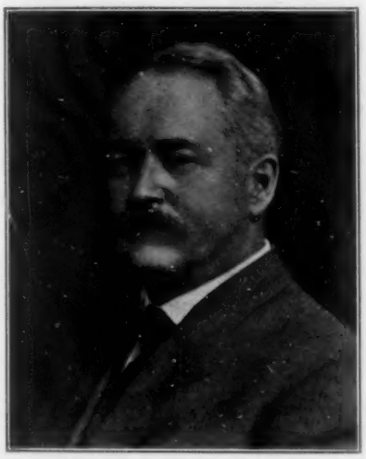
DETROIT TESTING LABORATORY and TORONTO TESTING LABORATORY, of Detroit and Toronto.—J. D. Stoddard, of these allied firms, was kept busy handing out post cards of Detroit. He was particularly well pleased with the exhibition and the outlook for business.

STANLEY DOGGETT, New York.—A. J. Johnson, of this firm, reported the sale of 17,000 pounds of the well-known Doggett Parting Compound at the end of the third day, and that's going some. They were more than pleased with the results of the business done.

FALLS RIVET AND MACHINE COMPANY, Cuyahoga Falls, Ohio.—George Wadsworth said he had never seen an exhibition where so much interest was displayed. He had a specially fine exhibition of the Wadsworth machines, such as sand crusher and compounding mill, and many different kinds of core making machines, core cutting and coining machines, core ovens, dryers, racks, cabinets, etc. Mr. Wadsworth reported a lot of good orders.

J. A. FAY & EGAN COMPANY, Cincinnati, Ohio.—This company had on display a large line of woodworking machinery for the pattern shop, which drew a crowd continuously, and excited much interest. The management was particularly well pleased with the interest displayed by the visitors.

OFFICERS OF THE F. AND M. S. A.



F. N. PERKINS,
President.

C. E. HOYT,
Secretary.

J. S. McCORMICK,
Treasurer.

FOUNDRY SPECIALTY COMPANY, Cincinnati, Ohio.—F. W. Weissmann said they had done a nice business on account of their exhibit, and was well pleased with the results and with the exhibition in general.

GARDEN CITY SAND COMPANY, Chicago, Ill.—Uncle Billy Chambers was around among his many friends talking up the merits of the sand furnished by this company.

GOLDSCHMIDT THERMIT COMPANY, New York City.—A. M. Guenther was kept busy explaining the merits of thermit as used in foundries. This exhibit attracted considerable attention, and Mr. Guenther said he was particularly well pleased at the interest shown in their exhibit.

GULICK-HENDERSON COMPANY, Pittsburg, Pa.—This firm was on hand explaining their work as foundry chemists, and reported that they were well pleased with results attained.

HAWLEY DOWN DRAFT FURNACE COMPANY of Chicago, Ill.—The exhibit of this company, which was attended by Col. C. E. Bleyer, Cliff M. Bleyer of Chicago, Capt. Ringer and I. R. Gourley of the New York office, consisted of one large and one small Hawley-Schwartz furnaces, besides one of the same kind in the temporary building, as well as one of the New Reyelbec (C. E. Bleyer spelled backwards) furnaces. Col. Bleyer said all the furnaces on exhibition had been sold and orders booked for many more. He was greatly surprised at the amount of interest shown by everyone, and was greatly pleased with results.

shake and cheery word selling 1,600 gallons of core oil in the first couple of days of the meeting is going some, but then he is a hustler.

E. KILLING'S MOLDING MACHINE WORKS, Davenport, Ia.—Mr. Killing said he had booked a nice number of orders for their line of molding machines, and was very well pleased with results attained by the exhibit.

ARTHUR KOPPEL & COMPANY, Pittsburg, Pa.—E. D. Selden, in charge, said he had not expected to book any orders, but simply stir up interest, but was more than pleased that he was taking some fine orders home with him, and the number of inquiries and interest displayed was way beyond anything he had anticipated.

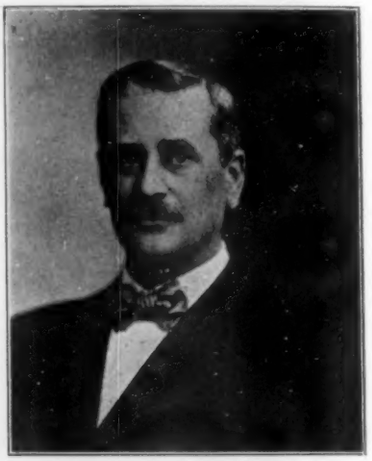
KROESCHELL BROS., Chicago, Ill.—Mr. Kroeschell, head of this firm, along with Mr. Schwartz, partner of the Kroeschell-Schwartz brass melting furnaces, reported a large amount of interest in these furnaces and many good orders booked. This firm has just brought out a tilting furnace along the same lines as the present one, which excited much interest. They also had on exhibition a drying stove for skin drying molds, for which they have many orders booked; also a fuel oil pumping system direct conected to blower.

LANE & BODLEY COMPANY, Cincinnati, Ohio.—This firm exhibited an engine suitable for power for foundries, which attracted much interest.

THREE OF THE VICE-PRESIDENTS OF THE F. AND M. S. A.

R. S. BUCH,
Second Vice-President.

F. B. STEVENS,
First Vice-President.



S. T. JOHNSON,
Third Vice-President.

One of the furnaces sold (largest size) went to the Aluminum Company of America, making the third one sold to this company, and who will have six by July 1. The other furnaces sold went to Baye Bros., Berlin, Germany, Consolidated Pneumatic Tool Company of London, the Hugh Meure Company, Cincinnati, Ohio, and the Standard Sanitary Company, Louisville, Ky.

HAUCK MANUFACTURING COMPANY, New York City.—This firm showed a line of portable oil burners for skin drying, baking molds, heating ladles, firing cupalos, etc., which attracted considerable attention. They reported some nice orders booked and that they were particularly well pleased with results.

HERMAN PNEUMATIC MACHINE COMPANY, Zelienpole, Pa.—C. E. Pettee explained to visitors the merits of the company's jarring molding machines, and said he was particularly well pleased with the interest displayed by visitors.

HICKMAN & WILLIAMS COMPANY, Pittsburg, Pa.—F. M. Eaton in charge, said he was much pleased with the reception accorded their line of coke, pig iron, etc. He reported good business and many inquiries for future business.

HILL & GRIFFITH COMPANY, Cincinnati, Ohio. A large force of representatives of this company was on hand to show to foundrymen the merits of their large line of foundry supplies. They reported many sales and much interest in their exhibits.

HOLLAND LINSEED OIL COMPANY, Chicago, Ill.—Everyone who uses core compound knows Peter Baumgardner, with his hand-

THE LODGE & SHIPLEY COMPANY, Cincinnati, Ohio, exhibited a large wood working lathe, about which they had many inquiries, which the representatives thought would result in future orders.

WALTER MACLEOD & COMPANY, Cincinnati, Ohio.—This company exhibited many things of interest to the foundrymen, the one of most interest being a sand blast, which attracted a large crowd while it was in operation in the temporary building.

MANUFACTURERS' EQUIPMENT COMPANY, Chicago, Ill.—President Paul Grebel of this firm showed to a continuously interested crowd of spectators their line of chucks. These appliances were new to many spectators, who marveled at the rapidity with which work can be handled. Mr. Grebel reported many orders and great interest.

J. S. MCCORMICK COMPANY, Pittsburg, Pa.—This company had on display a full line of foundry supplies, many of which they manufacture and others for which they act as agents. Mr. McCormick said he was delighted with the exhibition, at the interest displayed and the orders booked. A novelty which they exhibited was a bicycle made of foundry supplies, as well as their new metal separator.

METAL DROSS ECONOMY COMPANY, Bristol, Conn.—Bill Carpenter and assistants had something particularly new in a metal saving device for getting all the metal there is in the dross from brass skimmings. This machine is simplicity itself, and is thor-

oughly covered by patents. Interested spectators were shown how they could save a large amount of metal that was usually wasted. "Bill" took a lot of good orders along home, and expects many more.

Millers Products Company, Chicago, Ill.—Men in charge here explained the merits of Black Diamond core compounds and gave away interesting souvenirs. They reported some nice sales.

Monarch Engineering Company, Baltimore, Md.—Harry D. Harvey said they were taking home some nice orders for their "Steele-Harvey" furnaces. He was specially well pleased with the results of their exhibit, and expected many good orders would follow.

E. H. Mumford Company, Philadelphia, Pa.—These people were particularly well pleased at the reception accorded their new high trunnion machine, and some nice orders were booked.

Newport Sand Bank Company, Newport, Ky.—J. Frank Dye, president of the company, was all smiles at the reception their exhibit was receiving. He reported orders booked all the way from California to New York and some to foreign countries. They had a particularly fine display of every kind of sand for every foundry need. Also some fine samples of stove work and brass and copper work which had been made with their sand. Chimes composed of brass tubes when played on attracted the crowds. This is practically the same display that they exhibited at the World's Fair at St. Louis.

S. Obermayer & Company, Cincinnati, Ohio.—A large force of men, including the officials of the company, told visitors about the innumerable number of things they had for the foundrymen. This company had several displays, one of which was a very inviting place to rest. At their experiment exhibit they showed something new in an electric hammer clipper. E. D. Frohman said they were specially well pleased with the exhibition and the results attained.

Oliver Machine Company, Grand Rapids, Mich.—This firm had a particularly fine display of large and small machinery for the pattern shop, the most important being the Wadkin mechanical wood worker, which proved one of the biggest drawing cards of the convention. The representatives of this company said they were well pleased with results and the interest shown in their goods.

Osborne Mfg. Company, Cleveland, Ohio.—The rock-over molding machines exhibited by this company drew considerable crowds and excited much interest. They also exhibited a large line of brushes, brooms, bellows, etc., for the foundry, and took home a large number of orders. H. R. Atwater said he was greatly pleased with results obtained.

J. W. Paxson Company, Philadelphia, Pa.—H. M. Bougher, the president of this company, with many assistants, were kept busy showing their line of foundry supplies to visitors, including separators, brass furnaces, molding machines, specially for brass and a large line of other things. This company has just opened a Western warehouse, in charge of L. A. Crandall, at Toledo, Ohio, where they will carry a full line of their goods.

Pickands, Brown & Company, Chicago, Ill.—This company had an interesting display of Solvay coke, and reported good business.

Philadelphia Chaplet Manufacturing Company, Philadelphia, Pa., had a complete display of chaplets, big and little, and were kept busy explaining their advantages to interested callers.

Henry E. Pridmore, Chicago, Ill.—Practically all the management and sales force of this company was at the exhibition explaining the merits of their line of molding machines. One that attracted the most attention was a power ramming rock-over machine, which it is claimed will turn out 112 molds an hour. This machine, as well as others, are intended for brass, aluminum, or other metals and iron.

Rockwell Furnace Company, New York City.—This company had a fine display of crucibles, lift out and tilting furnaces, soft metal melting furnaces, annealing, tempering and double chamber furnaces. Both Mr. Quigley and Mr. Stevens said they were greatly surprised at the amount of business done during the exhibition, and in the interest displayed by visitors. They carried many orders home, and expect many more as a result of the exhibit.

Robeson Process Company, Ausable Forks, N. Y.—A specially inviting section with easy chairs for many visitors was occupied by this company. Mr. Robeson said this was much the best exhibition ever held, and that there had been much interest shown in this company's line of glutrin, a liquid core binder.

Sand Mixing Machine Company, New York City.—This firm had a novelty on exhibition in the shape of an electrically handled machine for sand mixing, which created considerable interest. The representatives of this machine were more than pleased with results attained and the interest shown.

Wm. Sellers & Company, Philadelphia, Pa.—E. L. Hayes said he had not expected to get any orders, but simply to work up an interest in their sand mixing machinery, and was more than pleased that he was going home with a goodly number of orders and lots of inquiries for future business.

W. W. Sly Mfg. Company, Cleveland, Ohio.—This firm exhibited a line of their tumbling barrels in miniature; also many photos of foundries where these barrels were in use. W. C. Sly said they were getting some nice orders, and that visitors showed considerable interest in their display.

J. D. Smith Foundry Supply Company, Cleveland, Ohio.—F. A. Coleman said he was more than pleased at the results attained from the exhibition. A large amount of interest was displayed in their exhibit of furnaces, core ovens, sprue cutters, molding machines, tumblers, etc. They took many orders along home with them, particularly for their core ovens, nine of which were ordered by the Falk Company, Milwaukee, Wis.; five for the Pennsylvania Steel Company, four for the Buick Motor Car Company, and seven to the Allyne Brass Foundry Company of Cleveland, making a total of 25 core ovens. Mr. Coleman said this was the best exhibition yet held, that people were buying, and everyone seemed interested.

Ed. E. Squier & Company, St. Louis, Mo.—Mr. Squier reported that they were well pleased with the results attained by their exhibit of foundry sand.

Standard Sand and Machine Company, Cleveland, Ohio.—One of the real novelties of the exhibition was a large machine this company exhibited. H. G. Broughton, president of the company, said they had done more business than at the other three exhibitions together. This big machine weighs eight tons and has a capacity of handling fifteen tons of sand an hour. They make a full line of elevating and conveying sand machines.

Sterling Wheelbarrow Company, Milwaukee, Wis.—J. R. Smith represented this firm in showing a specially fine line of brass worker flasks, wheelbarrows, trucks, etc. He reported a large number of sales, and was particularly well pleased with the interest shown in his line.

Frederick B. Stevens, Detroit, Mich.—Mr. Stevens and Jim Hughes were at their desk meeting old friends and making new ones for their superior line of foundry supplies.

The Tabor Manufacturing Company, Philadelphia, Pa.—Wilfred Lewis, the president of the company, with a large corps of assistants, told visitors about the Tabor line of molding machines, some specially for brass foundries, as well as their adjustable snap flasks, saws, etc. These people booked many orders, and were delighted with the number of inquiries for future business.

Whiting Foundry and Equipment Company, Harvey, Ill.—This company had two spaces, one as a rest space and the other to show their line of foundry equipment, such as core ovens, tumbling barrels, ladles, etc. They reported a large business done, and were specially well pleased with the interest shown in their exhibit.

J. B. Wise, New York City.—R. F. Goyne reported a large number of orders for the M. R. V. furnaces. The furnace that was exhibited was sold the first day. It is a new one, and was turning out metal every day, and attracted considerable attention.

ALUMINUM CONSUMPTION.

More than 17,000,000 pounds of metallic aluminum were consumed in the United States during last year, according to W. C. Phalen, of the United States Geological Survey. This is an increase of over 2,000,000 pounds over the consumption in 1906, which amounted to 14,910,000 pounds. The great increase in domestic use predicted in the early part of 1907 not being realized.

THE MANUFACTURE OF RED BRASS INGOT; ITS USES AND ADVANTAGES.*

By W. M. Corse.†

In accordance with the scientific spirit that is gradually finding its way into brass foundry practice, the foundryman of today is investigating his raw materials as never before. Competition demands that he take advantage of every point that tends to decrease costs. Managing the foundry economically is the keynote to success in any brass manufacturing business, so that a saving in the purchase of metals is one of the first things that is looked after by the modern brass foundry superintendent or foreman.

Ingot brass is not a new product. Ask any experienced foundryman and he will tell you that it is a material that is made up after the formula of sausage and is liable to contain as many things that are bad for brass as army canned beef once did for the soldier. He had good grounds for this opinion and he must not be considered an "old fogy" if he sticks to it tenaciously, for it is only within a few years that this stigma on ingot brass has begun to be removed and those cases are just beginning to attract serious attention.

It is the purpose of this paper to give an account of the manufacture of high grade ingot brass so that the foundryman may understand something about it and why it is now extensively used in castings in which the use of ingot was not allowed a few years ago.

The reason that ingots were generally bad is the factthat most of them were made from skimmings, grindings and low grade borings, which did not find a ready market. These were generally sold at lower prices to attract the foundrymen. The result of this practice gave ingot brass a bad name.

MAKING RELIABLE INGOT.

To overcome this prejudice, experiments have developed the following method with good results. It consists in using a mixture of red brass borings and copper together with any white metals that may be necessary to bring the mixture to a definite composition. Some ingot makers use a certain percentage of brass washings, while others consider a strictly high grade metal should not carry washings in its mixture.

We will assume that the ingot is to be made from borings and copper only. Experience has shown that brass ingot made from the average borings alone as found on the market, is often unsuited for good castings. This condition is due to the oxidation of the finely divided metal during melting and to the excess of impurities generally present. To overcome this, a certain percentage of new metal must be added. This is generally copper, either in the form of ingot, wire, or clippings. The amount added varies according to the composition of the borings used, but is generally from 20% to 35% of the melt. This addition of new metal makes an ingot that can be readily cast into sound clean castings which are easily machined.

The borings are first dumped on the floor, each barrel being carefully inspected for aluminum, manganese, bronze and other detrimental material before being added to the main pile. The usual weight for such a pile is from 10 to 25 tons. This pile is next thoroughly mixed, preferably by means of a mechanical mixer. When the mixing is finished, a sample barrel of at least 500 lbs. is taken from different portions of the pile in such a way that it will be thoroughly representative of the lot. This sample is run through a magnetic separator to remove the iron particles. Then the metal is melted in a large crucible with the proper fluxes, thoroughly stirred, skimmed, and poured into ingots. Several of the ingots are drilled and the drillings sent to the laboratory for analysis. From the analysis, the amount of copper and other metals needed to bring the ingot to the formula desired, is calculated. Even though the analysis shows more copper than the formula calls for, new copper is necessary in order to give to the material the properties desired. Often another sample pot is made up with the addition indicated by the first analysis and this analyzed, in order to be sure that the formula will give the composition wanted. Ingots made as carefully as above described should have an average variation in the copper content for example, of not more than .33 per cent. From this you can see that such an ingot can be used in particular work, that is, where the composition must be maintained within certain relatively close limits.

STANDARDIZING COST AND COMPOSITION.

As indicated previously, the cost of ingot brass is generally from ½ to ¾ of a cent a pound less than the same composition made from new metals. This enables the foundryman to give for the same price, a better metal than his competitor can give who is not using ingot brass; or what amounts to the same thing, it enables the foundryman to produce his castings at a lower cost.

In order to standardize both the cost and the composition so that the stocks carried, both by the consumer and the smelter, may be low, a standard formula ingot is generally made up. This formula is approximately 82 per cent. copper, 4 per cent. tin, 6 per cent. lead and 8 per cent zinc. As all these metals carry impurities even in the virgin state, a certain allowance must be made for these when buying on chemical analysis. The total impurities should not exceed 1 per cent. Variations in composition are also allowed for in the specifications, for it is impossible to make an exact formula even with new metals. A standard specification might be as follows:

Copper within	.5 %
Tin within	.1 %
Lead within	1. %
Zinc within	1. %
Iron less than	.35%
Antimony less than	.35%

or it may be stated as

Copper not less than	82%
Tin not less than	4%
Lead not more than	7%
Zinc not more than	9%
Impurities not more than	1%

It is difficult to say what amount of impurities are injurious, because what is harmful for one mixture or class of castings may not injure another class in the slightest. Several investigations have shown me, however, that the amounts of impurities mentioned are harmless. Furthermore, as methods of analysis are perfected, it sometimes happens that a definite amount of a metal present may give different results with the different methods. This has been proven in the case of iron. What was supposed at first to be an ac-

*Read before the American Brass Founders' Association at the Cincinnati meeting.

†Metallurgist Michigan Smelting Company, Detroit, Michigan.

curate method for iron gives only about 50 per cent. of the iron shown by another and evidently more accurate method. The iron was present nevertheless in both cases and the foundryman obtained equally as good results with the metal. This instance goes to show that the consumer and smelter must stand ready at any time to change their conceptions of the harmful amount of an impurity as more accurate chemical work gives them the true content. Comparatively little work has been done in a practical way to determine the upper limits of impurities that may safely be allowed, but as we progress farther along the lines of exact knowledge by the help of the testing laboratory, we shall soon be in a position, I hope, to give more accurate information on this subject.

The American Brass Founders' Association can be of service in just this sort of work by interchanging ideas and results. Those who have been in attendance at the various conventions can see, I am sure, a decided improvement already, so much so that it is hard sometimes to understand the attitude of certain people who take the stand that no value comes from a free interchange of experiences.

COMPARISONS OF SMELTER AND FOUNDRY COSTS.

Some of the first questions naturally asked are: How can the smelter afford to sell an ingot brass below the cost of new metal? and why can a smelter produce better ingot than the brass founder can make himself? In answer to the first, I would say that buying any material in large quantities at all times generally enables a concern to buy for less money, and also a concern whose business it is to buy continually can get the class of material needed to better advantage. Regarding the second question, I would say that the average foundry can not afford to carry in stock enough borings of the various kinds needed to make a good ingot because of the large amount of money invested. Furthermore, all borings do not run alike, so that, as they are found on the market, it is often necessary to mix as many as three or four lots to make the desired composition without adding too much new metal. The addition of new metal, especially copper, is necessary to make a first-class ingot, but in amounts of over 35 per cent. it increases the cost so that no saving can be made, a result not to be desired by either consumer or smelter. Then again, the average founder would have to melt relatively small amounts, which would necessitate an increased number of analyses and would increase the shrinkage in melting. All of these things would increase the cost to him, by increasing his fuel, cost of handling and loss of metal.

We must take into account, also, the fact that any manufacturing operation, to be carried on cheaply, always necessitates special equipment, which, if not kept in operation continually, costs more than it should. Even extra floor space costs something in the final calculation. The average foundry does not feel able to engage the service of an expert chemist or metallurgist to look after the melting operations. The smelter, however, is always glad to extend to the consumer such service in consultation as will be of benefit to him in the products turned out. So we see that even though it may seem wise to make ingot brass in the average brass foundry, it will appear evident, when all the items of expense are considered, that the saving in buying from a smelter is bound to be more than it would appear at first.

TYPES OF FURNACES.

A word here regarding the best type of furnace to use may not be out of place. It is generally conceded that the quality of the metal melted in a crucible is better than that melted in a reverberatory or other furnace where the flame comes in direct contact with the metal. In expert hands this is not necessarily true, but in the hands of the average melter, a crucible gives the best results.

This is more particularly true when one is melting a material like borings that has a large amount of surface exposed to the action of the products of the combustion of the fuel. Large pieces like ingot will not be easily oxidized or "burnt," as the foundryman calls it, but when making brass ingot, as described above, a crucible made product is much more preferable.

INVESTIGATION OF COMPLEX ALLOYS.

Many ingot makers specify copper and tin content only, giving no guarantee as to what the balance of the formula may be. The consumer should demand a complete analysis, for we are coming to see that in brass, as well as in iron and steel, the impurities may determine the quality to a greater extent than the main constituents. All the elements present in small amount may not be impurities, for the intentional addition of metals like nickel, manganese and vanadium is often made, giving decided advantages to the physical properties of the resulting alloy.

So little work has been done in this field, especially in alloys containing more than two metals, that one cannot predict what will develop within the next few years. The iron and steel industry has given us many examples of the value of this sort of investigation, and metallurgists are beginning to apply the same principles to the non-ferrous alloys with very interesting results. This only goes to emphasize the fact that the brass industry is just awakening to its possibilities and that the modern foundryman must avail himself of every opportunity to learn if he would keep to the front. It is the realization of the facts stated above that has led some smelters to produce an ingot of exact composition so that the foundryman may have exact knowledge of the metals that he is using.

THE VALUE OF SCRAP.

A few years ago, the average foundryman relied on scrap when he used old metals. What are some of the disadvantages of scrap as ordinarily bought? From the nature of the material, no guarantee can be made as to its composition, neither can one tell readily if any objectionable alloys are present. The appearance almost wholly governs the judgment of its quality. This immediately opens the way for the introduction of lower grade material into the higher grade in percentages that are largely determined by the ability of the consumer to sort properly. The selling price of scrap is generally high enough so that any lowering of its average quality means a very decided loss to the consumer. Scrap always carries a certain percentage of dirt and foreign materials which make the shrinkage in melting higher than that of ingot metal. This shrinkage is a variable quantity and makes it difficult again to determine the value of the scrap. We can easily see, therefore, that in the matter of composition and of shrinkage, the ingot presents a decided advantage. In some cities the consumption of scrap has fallen off very noticeably within the past two years, its place having been filled by ingot brass. The apparent saving in ingot is not as great as in scrap, but the actual saving is more. The high price of copper during the years 1903 to 1907 tended to a lowering of the quality of all brass. Scrap reflects this condition so that its present average value is often less

than that estimated. The value of a guaranteed ingot is never uncertain on that account.

GENERAL CONCLUSIONS.

The description of the manufacture of high grade ingot brass makes it evident that a higher price must be asked for it than for the old style ingot or for scrap brass. A careful analysis of the situation, however, reveals the fact that the difference in price is more apparent than real and should not be construed as an arbitrary increase on the smelter's part, for he generally gives more nearly value received than the scrap dealer. The foundryman must learn, however, to distinguish between the different ingot makers and select the one who is responsible and will stand back of his guarantee.

To summarize, let me mention the six principal points of advantage in using ingot brass. They are:

1. Uniform composition.
2. Low shrinkage in melting.
3. Decreased cost in handling.
4. Exact amount of impurities known.
5. Value received for the price paid.
6. Saving in first cost over new metals.

While some points have been touched on in this paper that may seem a little foreign to the subject, I have tried to keep in mind the fact that what the brass founder needs is general as well as special information, for in these days it takes both kinds to travel on the hard, high road that leads to good castings.

MELTING BRASS TURNINGS IN THE OIL FURNACE.*

By Edward H. McVeen.†

EDWARD H. McVEEN.

For the past twenty-three years I have been melting brass, twenty years with the coke furnace, three years with the oil furnace. The three years' experience melting with the oil furnace brass turnings from automatic machines will be the subject of this article.

The turnings are from the yellow brass stock rods made by the best mills in the country. their composition averaging about 60 per cent. copper, 36 per cent. spelter and 4 per cent. lead. From these turnings we produce light ornamental yellow brass castings and some medium heavy plain castings for turning. These castings must all be sound, clean and smooth, the accomplishment of which is quite a trick, as every foundryman knows.

We are using a stationary oil furnace that takes two No. 30 crucibles in the one chamber, using an air pressure of seven lbs. and consuming three gallons of fuel oil to the hundred lbs. of brass melted, with a loss of 3 per cent. in metal, crucibles averaging from twenty to twenty-five heats. Two hours' time is consumed in melting 200 lbs. of metal, thirty lbs. being gates and sprues, the balance turnings; the first heat from a cold furnace taking about one hour longer. This, I consider fair practice with our raw material, being turnings with a low market value.

In the oil furnace, we have the heat and blast under perfect control. This is of great value in feeding the furnace. Very often it is necessary to shut off the blast and oil to prevent the loss of fine particles of brass, flux or charcoal. In bringing down a melt, I put in crucibles about ten lbs. of sprues or gates, fill on top with turnings, using about 1 oz. of rock salt for flux, covering the whole with about 2 ins. of fine charcoal; start the blast at about 4 lbs. pressure so as to bring the heat up gently, as cold furnace and crucibles will cause both to scale and possibly fracture. In ten or fifteen minutes I increase the pressure and in thirty minutes I have a melting heat. From this time on the furnace requires the attention of the melter.

With the iron bar I find that the metal and charcoal are quite a solid cake, but I know that in the bottom of the crucible there is a nice puddle of metal, so now I break down this crust with the bar and force all through the liquid metal and I find I have room for about 10 lbs. of turnings. These are fed into the crucible and in a few minutes, giving time to consume the oil that is in the turnings, the same process of breaking down and forcing through the liquid metal is performed, and so on, using a little flux and charcoal until the crucible is full.

Now the oil and air pressure are gauged so that a rich sun-colored blaze fills the furnace and a green yellow cone-shaped flame shoots ten or twelve inches out of the top of the furnace. In a very short time you will recognize the zinc smoke, a sure sign that your heat is coming. I am not satisfied, however, with smoke alone, I must see the color of the metal, and note its clear liquid brightness before I tap vigorously on the iron tank for my helpers to handle the heat.

At times I have a little trouble with castings being rough and porous. In this case I increase the sprues and use less turnings, and for very particular castings, we use all sprues and gates or ingot metal from turnings. The melting of turnings to ingots and then remelting makes a wonderful difference in the castings produced, but is expensive. In the above I have given you my experience in melting turnings and I should like the trade to criticize to our mutual advantage.

DISCUSSION.

The following discussion took place upon the above paper:

Vice-President Webster: This is exactly the kind of papers that we need here. Mr. McVeen has been doing something very successfully for a very long time—something which all of us are interested in. He now comes here and tells us just exactly how he does it in order to get proper results, results which come from the years of experience he has had. We should like to hear from some of you in the way of discussion.

Mr. F. H. Schutz, L. Wolff Mfg. Co., Decatur, Ill.: Did I understand Mr. McVeen to say four pounds, or four ounces air pressure?

Mr. McVeen, F. W. Wakefield Manufacturing Company: We start with about 4 pounds, and we end up with about 7 pounds at the end of the heat.

Vice-President Webster: It is very important that this unit should be right. Mr. Schutz thinks it is ounces.

Mr. Parry, National Meter Company, Brooklyn, N. Y.: Both the Schwartz and the Rockwell Tilting Furnace use from 12 to 14 ounces, while the Harvey uses from 7 to 8 pounds. There is a difference in the air pressure.

Mr. McVeen: We are using the Monarch furnace.

*Read at Cincinnati meeting of American Brass Founders' Association.
†With The F. W. Wakefield Brass Company, Vermillion, Ohio.

Vice-President Webster: Is there any further discussion? This is one of the main things we are organized for. We are here to discuss just these matters.

A member: How fine do you have your charcoal?

Mr. McVeen: About medium size—quarter-inch pieces.

Mr. W. M. Corse, Michigan Smelting and Refining Company, Detroit, Mich.: I think Mr. Schutz is thinking about an open furnace where the flame plays right on the metal. Mr. McVeen is talking about a furnace where the flame plays on the outside. The practice of the Schwartz furnace type is to lower your pressure. In the last years they have been lowering it right along. With the other proposition you have a different type of furnace.

Mr. Schutz: When we first got the furnace they recommended from 6 to 16 ounces. I have found it better after actual experiment to cut the air down. We carried 25 pounds oil pressure and 6 ounces air.

Mr. Parry: We use 45 pounds oil and from 14 to 16 ounces air. We use a Schwartz furnace, open flame, and a Rockwell Tilting furnace, which is a crucible furnace, using as they say, 12 ounces, with an impeller type of blower. We finally got the best effect by using 45 pounds oil pressure and 14 to 16 ounces air with the Rockwell Crucible Tilting Furnace.

Mr. Patch, Lumen Bearing Company, Toronto, Canada: Do you know what the volume of air is?

Mr. Parry: No, I do not know that.

Vice-President Webster: It has been suggested that Mr. Olsen can give us some points on this subject. May we hear from him?

Mr. Olsen, Ohio Brass Company, Mansfield, Ohio: We use 20 ounces on the Schwartz and 20 ounces on the steel Harvey. I do not see what we would do with 41 pounds even in the crucible melting furnace; and I do not believe you can apply 41 pounds to an old-fashioned pit furnace with forced draft.

Mr. Cope: I have tried it both ways. We carry 45 pounds on our air line. I tried throttling that down very low on some suggestion that we would get better results. I use direct 45 pounds automatic, right from the line, fed by gravity. I do not know, but I think I am taking as many heats out of the Monarch furnace as any that I know of, and my crucible lasts just as long.

Mr. William M. Corse, Detroit, Mich.: I think the Monarch furnace when it first came out advocated anywhere from 45 to 60 pounds air pressure on their burner. I know the firm I was connected with at that time was talking about putting one in. The reason we could not put it in was because we did not have an air compressor available that had that pressure. Some kind gentleman said that they are running between 7 and 8 pounds. The type of that burner may have been changed; but in connection with the Schwartz furnace proposition I will say that I have handled a line of five or six of them for a number of years. We found that while we ordinarily used a three-quarter-inch tuyere opening and about 16 to 18 ounces pressure that we did not get anywhere near as much pressure as we did with a 1⅝-inch tuyere opening with about 9 to 12 ounces pressure. You can figure it out, as Mr. Patch says, that the volume of air under 10 or 11 ounces pressure going through an 1⅝-inch tuyere opening is about two or three times as much as you get under a 24-ounce or possibly less through a three-quarter inch tuyere opening. When we made the change enlarging the tuyere opening and reducing the air pressure it made so much heat that we did not know what to do with it, we had to throttle it down. I think the iron men will say that the general practice with iron furnaces is to increase the tuyere opening and lower the pressure. That does not apply necessarily to the Monarch burner, because that is an outside burner, is not enclosed and has no combustion chamber directly connected with it. It sucks the air in with it—unless they have changed it.

Mr. Parry: They have not changed that.

Mr. Corse: If I may be permitted to do so I will add another word. The last paragraph of Mr. McVeen's paper called attention to something that interested me particularly. That is the few words about getting better castings by using remelted metal. In my present connection I have occasion to see that demonstrated very forcibly. I have had the question asked me dozens of times whether a man could get just as good results by taking brass turnings, buying them direct from the dealer, melting them down and putting them right into action as we can by taking remelted metal like ingot brass and making up mixtures according to the formula and then putting them into castings. Mr. McVeen says he gets better castings by using remelted metal. If you want to get the best quality of castings for steam or hydraulic pressure work, apparently from his paper and from my experience it is better to use remelted metal, because the oxide of zinc has a chance to flow to the surface, and the impurities have a chance to come out on the second melting. The same principle applies to manganese bronze and other metals with high zinc.

Mr. Hamilton: We make a great deal of work that is subject to government test, and of course particular attention has to be given to this work when you know there is going to be a special inspection of it, and that it must be up to the standard. I have two Schwartz furnaces that I have run for about six years. Is there not some certain combination of oil and air pressure necessary for proper combustion? It appears that one man is using two pounds pressure air, and another is using forty-five pounds oil pressure.

Mr. Corse: The figures given must necessarily vary because they are talking about different types of furnaces. Mr. Cope is using an open-flame type, while you are talking about another proposition where you are driving the flame right down on the metal.

Mr. Hamilton: I know there must be a proper combination to produce the best combustion and bring it to the highest possible point. I know that in using a Bunsen burner you have to have it just right.

Mr. Corse: When I first went into the brass foundry I went in by means of a mechanical laboratory. I had handled a Bunsen burner for ten years, and that was the first thing I thought of. They were having all kinds of trouble with the slag coming off, two or three times as much as there ought to have been. I immediately said that if we could get a reducing flame we were all right. In order to get a reducing flame with oil and air all that is necessary is to give it enough air; but the minute you give it enough air it does not smoke and you do not get heat enough. I sought to remedy that by making the tuyeres 1⅝-inch and cutting down the air pressure, believing that in that way I could get enough heat and still use a smoky flame. Somebody is going to come along some day and invent a burner that will give you a reducing flame. Every smelter has to do that. If you are in the copper region you regulate your furnace all the time so as to give you either an oxidizing or reducing flame. The steel men have that to contend with, too.

I think there must be something in the design of the burner. If you can get a burner properly designed to give you a reducing flame the Schwartz people will give you a whole bunch of money, because it will enable them to push the sale of that furnace. You will note that the newer types of furnaces are crucible types. Rockwell's is a crucible type, and so are others of the newer furnaces. Why is it? In the city that I come from it is hard work to sell an open oil furnace now. Lots of people have offered to give them to me if I would take them off their hands. Why, theoretically they are all right, and a whole lot of people will continue to use them. If Mr. Reardon of the Westinghouse were here he could tell us that he is making all kinds of copper castings with the Schwartz furnace, and he seems to be making them successfully. He is making them, and so he ought to know what he is doing; and he does know what he is doing. Mr. Jones in their metallurgical department is as good as any there is in the country.

I would like to see somebody get a reducing flame and hitch it on to the Schwartz furnace; but I have not been able to find that fellow yet. I wish he were here in the room to tell me how to do it. Everybody likes the Schwartz furnace because of its ease of manipulation. It takes the smoke out of the way of the men's heads. It is a cooler proposition, in the summertime particularly; requires cheaper labor, cheaper fuel, and everything of that kind; but you have the oxidation and excess shrinkage to contend with. I think Mr. Olsen can say something more on this head. I know he is running four or five of them now.

Mr. Olsen: We have been up against that same proposition all the time. The foundry foreman complains that if he shuts down his air supply he cannot get his heat. We are getting fair results by using 20 ounces of air. We burn natural gas instead of fuel oil. We have a pressure of gas of about two pounds. That may make some difference, I do not know. About twice a year we get low on our gas supply.

Mr. Parry: Speaking of losses in melting with the Schwartz furnace, I would say that we put in one thousand pounds of copper, and when we came to weigh it we found that we had one thousand and ten pounds! (Laughter.) We found the city scales were out. We have had the Schwartz furnace for six years. We can melt one thousand pounds of copper down there with a loss of one-half of one per cent. We can do it to-morrow—no question about that.

But we can also make better castings in the crucible furnace too. Our experience is exactly in line with everything that has been said here. If anybody can get that reducing flame, first get an oxidizing and then change it to reducing, that man is going to be a millionaire. We know theoretically how to do it, but we cannot make it in reality. The Schwartz furnace possesses facility in handling and getting out big heats, and getting them out quickly; and in that line nothing on the face of the earth can touch it. But we are not buying the Schwartz, as the crucible type is the new furnace.

Mr. Schutz: I believe I have the second Schwartz furnace that was ever built. The Schwartz people did not know anything about the furnace, neither did we. I said, "If it will melt brass I am satisfied"; and I went out to Chicago and saw them melt brass. So we got one of their furnaces. I will say like the rest of them, I guess I have bucked up against all the trouble that I ever want to buck up against, because we had to overcome different troubles. You have to find out the faults of these things and then overcome them. I guess pretty nearly everybody in here knows the brass that we turn out, knows our goods, and knows the kind of brass we turn out. I do not know as I have seen a furnace yet in this exhibit, or anywhere else, that I would trade for a Schwartz furnace. Now in regard to the flame business, that is one of the main things that must be overcome, and another thing that we have to watch is the little oil pipe burning out. The further that burns out the worse results you are going to get. You can tell it in a moment if your oil pipe is burning up in the tuyere end, you can very readily tell by looking at the flame whether the tuyeres are right. We have gotten best results from actual study. I have studied out this furnace because I had to do it, for when you are using a large amount of metal you dare not spoil some of it every day or you will bankrupt the best firm that ever existed. Therefore I had to study the thing out and do it quickly. The Schwartz furnace has given us good results, but there is that one thing lacking, as we all know that have tried them, and that is the burner. They will have to get a burner on there that you can regulate to suit yourself, and then it will be all right.

THE ART OF METALIZING FLOWERS.

COMPILED BY CHAS. H. PROCTOR.

In the art of electro-deposition of metals, the metalizing of the product of Nature probably appeals more to the artistic temperament than any other branch of the art. The reproduction in metal of the beautiful rose, the crysanthemum, the violet and many other flowers in an exact counterpart in every detail of the original; it does not seem possible, but such is the fact, and everywhere in the art-jewelry and department stores in the cities, large and small, can be found reproductions of Nature's handiwork in metal, the coloring so true that the flowers themselves seem as though plucked from Nature's garden.

These examples of reproduction in metal are used for numerous purposes, such as hat and shawl-pins and with the branches of leaves for candlesticks, pen-racks, ink-stands and many other useful articles, and they are constantly receiving additions, and the coming season will probably find many new and novel methods for their use that will prove artistic and useful.

LARGEST MILDRED GRANT ROSE EVER GROWN, METALIZED WITH BUTTERFLY AND DARNING NEEDLE, BY DELAMOTHE.

The reproduction of any of Nature's products can be considered an art, and from the artistic standpoint it can readily be said that the art of electro-deposition of metals has reached an advanced stage when Nature's loveliest children, the beautiful flowers, can be reproduced with such exactness in metal as to become a thing of beauty even as Nature has adorned it.

The metalizing of flowers is a new innovation in the art, but the idea of reproduction or galvanoplasty is not new. Soon after Professor Jacoby, the eminent Russian scientist, announced to the Academy of Sciences in St. Petersburg seventy years ago of the discovery of the utility of galvanic electricity as a means of reproducing objects of metal the art of galvanoplasty or electro-deposition of metal had its first impetus, and for many years in England and on the Continent of Europe the artistically inclined had their batteries and cells for the reproduction of metallic objects, and many beautiful reproductions can be found in private and public collections of the early workers in the art. After some years the art became inert, except among the scientific men and others scientifically inclined, who by degrees carried the art along until the origin of the dynamo, which gave to it its greatest impetus, and from thence the art went rapidly forward until the splendid results developed which are accomplished at the present time.

In this short article it is the intention of the writer to give such information upon the subject of metalizing of flowers so that an amateur as well as an expert

plater can very readily learn to reproduce these beautiful objects in metal. The month of June is the month of roses, and the rose gives probably the best results of any flower for the purpose and can at this time be obtained on every hand at very little cost. I do not claim anything new either in the process or methods used, but believe that the operations when followed carefully will give as good or better results than any other method now in vogue.

PREPARING THE ROSES.

Keep roses in a cool place until ready for metalizing. If buds are closed, put in water of 70 degs. F., keeping the temperature of the room or ice box the same, when buds will open slightly and are ready for use. Flowers that are well opened should be kept in a dark place. Cut off stem of rose leaving one-half in. Pin calyx up to rose with very small pins (Lills). Insert a heavy pin into the butt of the rose, letting the head of pin come even with the end of stem.

Now take a piece of No. 20 bare copper wire about 14 ins. long and wrap it several times around the pin and stem, being sure that you have wrapped the wire very close on stem so that it will not slip from the wire coil.

SOLUTION NO. 1 FOR METALIZING.

Dissolve in a quart of 98 per cent. alcohol leaf orange shellac until the solution becomes the consistency of varnish. To this add two ozs. of U. S. P. colodion, then add to both four ozs. sulphuric ether.

SOLUTION NO. 2 FOR METALIZING.

Dissolve in 1 qt. 98 per cent. alcohol leaf orange shellac until solution becomes a fine thin varnish. This solution should be about one-half as thick in its consistency as solution No. 1.

SOLUTION NO. 3 FOR METALIZING.

Dissolve in 2 qts. of water 4 ozs. of nitrate of silver crystals. Evaporate water until solution begins to recrystalize. If solution should crystalize add a small portion of water. To this then add 1 qt. of 98 per cent. alcohol and 3 ozs. of ether. Now, having one or more roses on the wire, immerse them in solution No. 1 not to exceed five seconds. Rinse them carefully out of the solution, allowing them to drain, shaking gently to cause all surplus solution to fall from the flower.

If it is desired to open the roses any further or curl the leaves, this may be accomplished at this time while the roses are still wet, by using a thin, smooth pine stick about one mm. thick and ¼-in. wide, after which they are allowed to dry for not less than 20 minutes; then they are again immersed for a second in the same solution and allowed to drain once more. The roses are then allowed to hang in a cool place until the coating has become hard enough to adhere to the fingers when handling. Then extract the pins from the calyx which have become thoroughly adhered to the rose by drying. The pinning up of the calyx against the rose is not necessary, only when the calyx are hanging down toward the butt and stem of the rose.

Now take the roses and immerse them in solution No. 2 not to exceed five seconds. Drain, giving them a slight shake, causing all surplus solution to drain off rapidly. Care must be taken, as in solution No. 1, that neither solution is so thick that drops are seen to form on edges of the rose petals. When this is the case in either solution add a small quantity of ether. When roses have again become dry as heretofore mentioned, immerse them in solution No. 3 for 30 seconds.

The roses are now taken wet from solution No. 3 and hung in a perfectly air-tight box so that they will be at least 10 ins. from the bottom of the box. Take six or eight lumps of iron pyrites about the size of a hickory nut, and place in a deep porcelain dish. Pour over this enough water to cover the pyrites and add enough commercial sulphuric acid so that the proportions will be one part acid to eight parts of water, when hydrogen gas will immediately form. This acid should be added when vessel containing the iron pyrites and water has been placed in the box, as the box should immediately be closed air-tight and left to generate the gas for not more than 20 minutes. When opening this box care must be taken not to inhale the gas, as it is very poisonous and injurious. The box should be opened in the open air where fumes will not come in contact with machinery or other metals as oxidization takes place very rapidly. The nitrate of silver on the roses now being reduced by the action of the hydrogen gas, the roses are hung up and allowed to dry for about one hour. If it is observed that places on the roses have not been reduced by action of the gas, they have not stood long enough in solution No. 3 to allow the alcohol to soften the shellac coating. If the roses do not become dry down in the deep crevices, you have not enough colodion in solution No. 1. Owing to the fact of the deterioration of these three solutions on exposure to the air, the operator must necessarily be a close observer of effects upon the roses and additional ether, and colodion must be added to solution No. 1 and No. 2 as the defects in coating or reduction become noticeable. Solution No. 3 should have an additional ounce of crystals of nitrate of silver in bottom of jar in order to keep solution thoroughly saturated.

COPPER BATH.

A tank for this solution is most easily made by sawing a whisky barrel in two and lining the inside with asphaltum; a light coating will suffice. Make a solution of blue stone and water that will register 17 degs. B.; raise this solution with sulphuric acid C. P. until 20 degs. B. is reached.

BATTERY.

The battery consists of two porous clay cups for this size tank, 4 x 11 ins., and two amalgamated zinc plates weighing 8 or 10 lbs. each. Place the two porous cups in the centre of the tub so that the solution is 1½ ins. below the top of the cups, the top of the cups being at least 1 in. below the top of the tub. Now take two heavy copper rods sufficiently strong enough to support the weight of the two zinc plates and long enough to rest upon the edges of the tub in four places equally divided; solder these bare rods together in centre where they cross. Now take a sheet of copper 1½ in. wide and make a circle about 1½ ft. in diameter. Solder this circle firmly upon the bars.

Slits are cut in this copper band 1 in. deep. Hang the zincs to the two copper bars. Now take the roses and hang a porcelain weight on one end of the wire. This weight is used to keep the roses immersed in the solution. Sand paper the upper end of the wire and wedge it securely into the slits in the copper band surrounding the cups. Care must here be taken in immersing the roses in this copper solution that no air bubbles are in the crevices of the roses or the deposition of metal will not take place. The porous cups are now filled with water within 1 in. of the top, then add sulphuric acid C. P. in proportion of not to exceed one part acid to 30 parts water. Then fill the cups to the top with water, being careful that the copper wires supporting the zincs from the two copper bars are not

immersed in the solution of the porous cups. The zincs should hang free of the bottom of the porous cups. These batteries are not in action until the roses are hung from the copper rim and immersed in the blue vitriol solution, completing the circuit between the cells and the blue vitriol solution. Here, again, we wish to call attention to what is known as "local action," which is caused by poorly amalgamated zincs or too strong sulphuric acid solution in the cups. When local action sets in the plating is not progressing in the proper manner and the zincs are becoming rapidly consumed. This is readily seen by raising the zincs when a dark gray coating may be seen upon the zinc. The zincs must be removed and reamalgamated on the spots showing the attack of the local action.

As the plating progresses it will be noticed that the solution in the porous cups gradually sinks even and sometimes below the surface of the surrounding blue stone solution. Keep the cups, when this is noticed, filled with water to the top. This tank with the two porous clay cups as above described, is capable of plating 10 strings of roses, four to the string, in bud size, or eight strings of medium size open roses. While the plating is in progress copper is being taken from the blue vitriol solution. To keep up the density of this solution blue vitriol in sail cloth bags is hung around the edge of the tank. A further description of this cell may be found in Langbein's Electro Deposition of Metals. The solution in the porous cups of this battery should be renewed every ten or twelve hours, and the zincs well rinsed and brushed in clear water, twenty hours being all that is necessary in any case to finish the plating upon roses, and ten hours is enough for a priming coat where the operator has a generator and large tank with copper anodes for finishing large quantities. The solution for a large tank where a generator is used for finishing consists of water and blue vitriol, density 14 degs. B., raised to 20 degs. B., with sulphuric acid C. P., distance of anodes 4 ins. from cathode, current density ⅝ to ¾ volts. Generators must have separately excited fields with field rheostat to control the current. Six or eight hours will finish the roses in this solution.

FINISHING.

Rinse the roses in water. Boil in solution composed of ¼ lb. of carbonate of soda to 5 gals. of water, until they are entirely free from shellac. Then place in oven and anneal. Loosen the dry leaves from inside of the roses and place in a pickle solution of one part sulphuric acid and 40 parts of water. Warm this solution slightly and remove the roses after a few minutes. Rinse in clear water when they are ready for soldering on the pins and caps. Solder should be flowed between the leaves to strengthen them where the petals join each other. A valuable soft solder fluid for this purpose is composed of muriatic acid cut with zinc and enough aqua ammonia added until the solution becomes a milky color when the addition of ammonia should cease. Pins and caps for this purpose can be had from most any of the wholesale jewelers' findings concerns. After the pins and caps have been securely soldered to the roses, dip the roses in a solution of nitric acid for a few seconds (one part water and one part nitric acid) until the roses are thoroughly cleansed. Rinse off in hot water and quickly scratch brush. Now make a cyanide of copper solution, which is composed of 1 gal. of water, ¼ lb. carbonate of copper, ¼ lb. cyanide potassium, 98 per cent. current density, 4 to 6 volts, anode distance 2 ins.

Plate for 15 to 30 minutes to cover up all soft solder used in strengthening leaves and applying the caps and pins. After plating in the cyanide of copper bath wash well and dry out by the aid of boiling water and maple sawdust. If the solution does not work perfectly, add a little more cyanide.

Coloring and Finishing.—To produce the natural colors some little judgment is necessary. The best colors for the purpose are Windsor & Newton's oil paints. The reds are mostly used and consist of cardinal red, lake carmine, English vermilion, rose pink and other colors; for the dark rose tones, the dark reds are used mixed with a little transparent silver lacquer; for the pink shades, rose pink and lake carmine. For the lighter pink tones it is advisable to lightly silver the roses after dipping in the nitric acid dip and washing in water. For the leaves and calyx stems, light and dark chrome greens mixed to produce the desired shades can be used and prepared as directed above.

The silver should be used warm and can be prepared as follows: 1 oz. of cyanide of potassium dissolved in 1 gal. of warm water, to which is added ⅛ to ¼ oz. of nitrate of silver. The freshly acid dipped roses should be immersed in the silver dip for a couple of seconds to give a white tone, then washed and dried out, then the surface should be lacquered with a transparent lacquer as before mentioned and allowed to dry. When dry the color is applied with a ¼-in. flat badger or sable hair brush, blend with a blending brush and then wipe off in spots with clean soft muslin rags.

For the dark shades it is not necessary to silver, but it is advisable to color lightly after dipping in the nitric acid by adding to 1 pint of cold water a small piece of liver of sulphur about as large as a pea. This will produce reddish tints upon the copper when immersed for a second or two and assist in producing the Jack rose or Damask tones. The nearest approach to the natural tints give the most artistic effect.

If desired to produce silver or gold tones the following formulas may be used:

For silver bath:

Cyanide of potassium	4 to 5 ozs.
Chloride of silver	2 ozs.
Water	1 gal.

For gold bath:

Cyanide of potassium	4 ozs.
Chloride of gold	8 dwt.
Water	1 gal.

Use the solution warm.

The French gray and rose gold tones are very effective upon this class of work, the formulas for which may be found in previous issues of THE METAL INDUSTRY.

To avoid oxidization all finishes should be lacquered with water white transparent dip lacquers before painting or after silvering or gilding.

CUTLERY IN SMYRNA.

United States Consul-General Ernest L. Harris, of Smyrna, furnishes the following reports regarding cutlery: Ordinary table knives, forks and spoons are imported into Smyrna chiefly from England, France, Germany and Austria. Those from England consist of white metal, and, whether knife or fork, usually sell from 50 to 75 cents the dozen. These are the very cheapest sort, and are to be found in the bazaars especially, as the price is so low as to enable the poorest household to be supplied with them. England also furnishes this market with polosi, nickel, and electro-silver plated knives and forks in large quantities. Polosi silver sells for $1.70 to $2.20 the dozen.

NOTES ON BRASS MELTING*

By Chas. T. Bragg.†

GENESIS.

CHAS. T. BRAGG.

In the progress of any art or craft, particularly one that is almost as old as authentic history, a wide divergence of opinion and practice must be expected and allowed for in any consideration of the improvement of that art or craft. We are told that the Phœnicians, early Greeks and Egyptians were more or less acquainted with the manufacture of both brass and bronze, so that the processes now in use can be nothing more than the products of industrial evolution down through that long and eventful period of time intervening between 2000 B. C. and 1900 A. D. Undoubtedly in the past, as in the present, the art of brass-making advanced in its technique only as increased demand for it for various usages forced it to advance.

After considering its age and the wide demand for its products, it is remarkable that the brass and bronze world is not as yet on the scientific basis that many of its sister industries entertain. Not to consider the history of the art and all those things which have brought it to its present condition of usefulness, we find ourselves properly considering its future. Present day equipment and processes for the saving of time, insuring quality and increasing volume are deserving of some commendation, but do not fulfill the needs of the industry. As to how and why they do not there is, as was said in the beginning, considerable difference of opinion, and considerable difference of practice is, therefore, to be expected, due to lack of concentrated effort from those of us who are directly interested in the welfare of the art.

DEFINITE COMPOSITION ALLOYS.

The making of alloys of standard composition seems to be drawing well-deserved attention. There is a considerable degree of uncertainty in many brass foundries as to the actual composition of the alloys made in those foundries. The proportion of prime metals used to make an alloy are often weighed with great care, and completely neglected thereafter. No consideration is given to losses of the original material, and no compensation made for losses while the scrap from that original material is being sent back through the remelting cycle, or at least not in a scientific way.

If we make an alloy of a definite chemical composition and find that it has physical characteristics of a marked nature suitable for a given purpose, it is obvious that in a future call for that alloy its composition should not vary, if we expect it to have the physical characteristics that it had before, and do not care to disturb the financial value assigned to it. The gradually increasing demand for alloys of certain definite physical characteristics is bringing about the development of a great number of metals about which too little is known. Undoubtedly, in many cases, if instead of finding a new alloy to suit each new engineering condition that arises we knew something of those we already have, we would find that another was not needed. In order to know our alloys in all their phases, and in order to be able to keep their constituents always present in a constant proportion, the fewer we have the better. From the manufacturer's standpoint, it is easily agreed that forty or fifty alloys in one foundry very much resemble a flock of sheep, always mixed up, doing nothing in particular and lost if not carefully guided. In order to completely standardize our alloys and keep them under control, unquestionably the fewer we have the easier will be the subsequent labor and the less intricate the system necessary. As long as we are not all making the same classes of work the same alloys are not likely to be used by all of us, but each of us can doubtless find that alloys for classes of work rather than for details of each class will serve most of our needs, and subsequently we will see that increased efficiency of those we do make will more than offset any inconvenience incurred by reason of the reduced number.

SELECTION OF SUITABLE ALLOYS.

Several factors are important to the successful standardization of alloys. Good original alloys, complete knowledge of materials to be used in their manufacture, control of the furnaces in which they are made, knowledge of the changes and causes of the changes taking place in those furnaces, and complete knowledge of the composition of the resulting alloy, are the chief ones to consider. The choosing of suitable alloys is, of course, largely a matter of personal decision, but that decision is often influenced by factors unknown to the one making such decisions. In other words, in experimenting to find the most suitable alloy for a class of work absolute knowledge of the quality of the materials used and results attained is essential. For this knowledge we must turn to the science of chemistry. It is not so much a question of whether we have produced what we want as it is whether we have complete data on what we have produced, and whether we can repeat the production of that article.

Let us say, for example, that we are developing an aluminum brass. Let us say that copper, zinc and aluminum have proved themselves the elements necessary to make an aluminum brass. After repeated trials, using various proportions of these elements, we fail to get the desired physical characteristics. All conditions are equal, the analysis of the copper and aluminum show them to be pure, but the zinc contains iron, lead and cadmium. Using the same grade copper and aluminum, but a zinc free from impurities, we find ourselves able to produce aluminum brass to our satisfaction. We have begun an important thing, that of using articles about which we are thoroughly informed, and have cleared the road to the reproduction of the alloy in question, without difficulty at least from the standpoint of the prime materials to be used. An analysis of the metal produced will show what our real alloy is, and what it is that we are trying to make. That is, if the metal as it leaves the furnace is the composition desired to give the physical characteristics needed, then the composition that goes into the furnace is only important in that it shows what changes have taken place and what compensation must be made for those changes, if that metal is ever to be made from its own scrap, gates, sprues, etc.

Considering now an alloy of ordinary constituents, variations of composition may be assigned to several

*Read at Cincinnati meeting of American Brass Founders' Association.
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causes, such as oxidization or volatilization of one constituent to a larger degree than others present, loss by the same means of two of three constituents in varying proportions, or loss of one constituent by its reducing action on the oxides of another, as the loss of zinc due to its reduction of copper oxide, etc. In a forced draft furnace other agencies have considerable bearing on the change of composition, chief of which is the action of gases, both unburned and products of combustion. The action of these gases, such as nitrogen, carbon monoxide, carbon dioxide, sulphur, dioxide, etc., on brass at high temperatures has been but imperfectly studied, although some of their general properties in other connections are well known. In a furnace which exposes an alloy to all these influences, certainly the best results are not possible, and the only road left open is to overcome natural defects of the furnaces by outside means.

LOSS BY OXIDIZATION AND VOLATILIZATION.

Undoubtedly the greatest cause of variations in composition is due to oxidation and volatilization. We will consider the loss of zinc in detail, inasmuch as it is both easily volatilized and oxidized. It is easily understood that at 718 deg. F, if exposed to air, zinc then in its melted condition begins to oxidize. 1652 degs. F, the temperature at which zinc volatilizes, is easily attained in brass melting. If sufficient time is given at 1652 degs. F, or the temperature raised very high above this in short time, all the zinc will volatize. We are considering now that the zinc has been melted alone. When melted in brass it behaves, as far as we know, as when melted alone. That may or may not be true, inasmuch as any definite chemical compounds formed between zinc and other constituents present may have considerable influence and doubtless do. The quantity of metal in a furnace has a certain influence over the time which must elapse to bring it to a required temperature. Therefore, since the melting point of the brass is above that of the zinc, zinc should begin to oxidize as soon as the melting point is passed. This again is variable, due to the fact that the contained zinc cannot be attacked by oxygen until the brass itself begins to melt, as it is not exposed, and due also to the different proportions in the alloy in which the zinc may exist.

CONTROLLING THE TEMPERATURE.

Taking the other constituents of brass or bronze into consideration, they might be handled in much the same way, depending, of course, on what they are. It would seem that a fixed length of time for a given quantity of a given metal with a fixed oil or gas and a fixed air pressure would be all that is necessary to make a brass of given constituents leave the furnace each time practically of the same composition. As heats of various sizes of various compositions for different classes of work are usually made by most foundries, it is evident that any such procedure would involve considerable difficulty. However, it would be comparatively easy to establish a temperature at which these various compositions should be removed from the furnace, and at some future time this may be possible. When it is possible to equip a brass-melting furnace with a pyrometer which will at all times tell the temperature of the contained materials, the road to standardizing alloys and stopping molding troubles of many kinds will have been reached. Measuring temperatures in the crucibles serves many good purposes, but does not eliminate the expense of varied compositions, nor does it eliminate the expense of furnace losses. Every composition has a definite melting point and a definite casting temperature, and the determination of just what these points are can be done only with a pyrometer. It is easily seen that if a brass or bronze of any composition is brought to a certain temperature in a definite length of time, its original and melted compositions could be made very nearly constant. It is worthy of note that very little attempt has been made, as far as the writer knows, at least, to bring this about.

STANDARDIZING THE COMPOSITION.

We have considered now the causes for the variations of composition of an alloy while in the furnace. We have seen that considerable variation is possibly due to many causes, and must admit that it is very difficult to overcome many of these with present means. In spite of all this, it is still possible to keep the compositions of our alloys very nearly standard, if certain conditions are kept in mind. We have said before that if we know the purity of our virgin materials, and find the alloy which when made from certain proportions of these materials gives us the alloy with the properties and cost desired, that we should endeavor to produce that composition constantly. There are two ways this may be done.

First:—The total loss of given original constituents in the furnace may be determined and an analysis of the resulting material obtained, from which calculations back to the original composition may be made.

Second:—The analysis may be made of the resulting material and calculation made back to the original composition without knowing the total loss.

In order to use the first method the total loss in the furnace may be obtained as follows. Weigh the virgin metals in the proportions before found to produce the alloy needed. Place in the furnace and melt, bringing the alloy to the desired temperature, to pour the castings for which the alloy is intended. Observe the temperature attained and the time elapsed during melting, and when repeating the experiment, which must be done several times to obtain a fair average, endeavor to have the time elapsed and the temperature attained nearly the same as before. This is assuming that the oil or gas, and air pressures (in furnaces using them) are kept constant. Weigh the metals in the crucibles after melting. The weight of the metal after melting, plus the metal in the slag, subtracted from the weight before melting, will give the loss for the particular furnace in use under the particular conditions mentioned. Needless to say, the oftener the experiment is repeated the nearer correct will the total loss assumed become.

REBUILDING THE ALLOY.

After establishing the total loss, repeated analyses of the product will show the average change in composition from the original proportions put into the furnace. This average of results should be considered as the composition of the alloy it is desired to produce. Now when the scrap, gates, sprues, runners, etc., from the alloy produced are returned to the metal depository they should be kept distinctly separate from that of any other alloy, and when again issued to the furnace should have added the metals lost during the former melting. The amount to be added may be calculated in the following way: Take 100 lbs. as the unit weight of the original alloy. Subtract from that the percentage in pounds total loss established for that alloy. From the resulting figure, using the average analysis of the produced alloy, calculate the actual weight in pounds of each constituent present in the produced alloy, and subtract the result from the number of pounds of each corresponding constituent in 100 lbs. of the original alloy. The difference is the weight of each constituent lost per 100 lbs. of metal melted. That is, 100 lbs. minus the total loss per 100 lbs. in pounds, plus the metals "burned out" should be the metals reissued to the furnace. Let us say, for example, that the loss on original materials was 5 per cent., then

95 lbs. of gates, sprues, etc., plus the amount of copper, zinc, lead, tin, etc., lost, in total 100 lbs., would be the proper amounts to issue to the furnaces. In arriving at the quantities of each constituent lost, the reason for the apparent gain in some slightly volatile metals such as copper, will be easily seen. The scheme as outlined above is open to the objection that the means of determining the total furnace loss is not to be compared for accuracy with the chemical laboratory process which determines the ratio of the constituents, although that depends, of course, on just how carefully both are carried out. In using this scheme, it must not be supposed that the losses for one alloy can be calculated to show the losses for others. The reason for this has been shown before.

In order to use the second method, the analysis of the produced alloy may be considered to represent the proportions of elements present per 100 lbs. of metal produced. Then 100 lbs. of scrap may be reverted to the original composition by adding 100 lbs. of prime metal in the proportions necessary to either increase or decrease the various constituents. This is open to the objection that for each unit weight of scrap issued, an equal amount of new metal must be used. This does not use the scrap on hand rapidly, and too rapidly reduces the virgin material on hand. This may be avoided by adding to 100 lbs. of scrap, the materials lost in largest proportions in quantity sufficient to reduce those present in largest proportions to the desired amounts. As this involves merely a problem in arithmetical proportion, it is easily worked out, and presents by long odds the best practical working way, for ordinary alloys, of using the scrap produced. It has the advantage that it uses scrap rapidly, requires little prime metal, and exposes less new material to the influences that cause loss. That is, the scrap itself, as shown before, will theoretically suffer less loss of its easily volatilized or oxidized constituents, than new materials will.

This introduces an error in the rebuilding scheme, since scrap made from scrap which was made from new material, must be considered to be of the composition of scrap made from new materials. However, over a period of time, this discrepancy corrects itself as the materials go back through the remelting cycle.

In using turnings from our own alloys or scrap purchased outside it is largely impractical to determine furnace losses for each case, and inasmuch as it is likely to be of variable composition from lot to lot, it is not practical to determine it for certain cases and calculate from that basis for others. In the case of turnings from our own alloys it is likely to be difficult to keep the turnings of one alloy from being contaminated with turnings from other alloys. In addition, since the particles are small and more exposed to oxygen and heat, the loss is not to be considered as anything like that of the same alloy when made from either new or scrap materials. In general, if a sample of turnings is melted under the conditions that the alloy in which they are to be used is melted, and then analyzed, they may be calculated into the alloy for which they are intended, using the alloy to be produced as the basis for calculation, as their loss has been already considered in the analysis.

BRONZE IN BABYLONIA.

Among the Assyrians, knives and long chisels or hatchets of bronze were among the objects found at Tel Sifr, in southern Babylonia. The earliest bronze image, according to the best authorities, dates back to 2100, B. C. Homer, among the ancient Greek and Roman writers, refers to copper, bronze and tin each in the pure condition.

WASTE HEAT.*

By F. W. Reidenbach.†

F. W. REIDENBACH.

As we are living in an age of invention; we are startled almost every day by some announcement of the achievements of mankind in every line of art, science and mechanics. It has been the chief aim of the present age to accomplish at least three things, viz.:

Speed over the earth.
Speed over the water.
Speed through the air.

In the efforts of the many to bring to a successful issue these three things, inventive genius has come into contact with many heretofore unknown substances. Before being able to cope with them, at least a partial knowledge of their power must be ascertained. Of these substances we are largely indebted to gas or gases for a large number of the conveniences and comforts of mankind. When the burning of bituminous coal first brought to our notice gas, it was not long before its bright and brilliant light took the place of the tallow dip in our homes; the striking of oil gave us the fluid burner and the kerosene lamp. What a joy came into the hearts of the people for this advancement of science.

A little later came the gas engine. This has consumed the time and attention of inventive genius until we now have:

Our swift speeding motor cars, boats and flying machines.

Had such a thing been predicted fifty years ago, the advancer of such a thought would have been incarcerated in a jail or an asylum and branded as a dangerous character to let loose upon an innocent people. But even today the use of gas to illuminate has taken somewhat of a back place. We have reached the electrical age and it seems as though the highest pinnacle of illumination has been reached.

But gas, that upon which the attention of this paper is directed, has by no means become obsolete. It still has numerous uses. It is still in its infancy. It still has greater possibilities than those which have been discerned or yet dreamed of. All combustible materials have embodied within them something of a heat producing nature which during the process of combustion produces a certain amount of gas plus heat. Now to reach the essence of what is intended in this paper: It is not a treatise of what has been accomplished, but more of a question asked as to what can be accomplished if a concert of the brain power now engaged in our foundry business can be centered upon the practical and economical advantages to be derived from the saving of this waste heat which goes off in the form of gas.

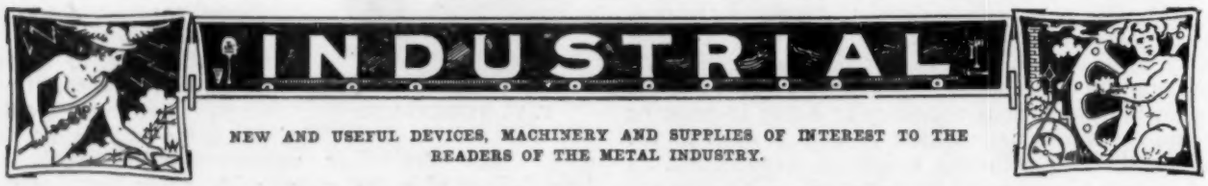
Do we as foundrymen get all the value from the combustible materials we use in melting the various metals? Or do we just melt metals? It seems to me we ought to utilize this waste heat to good advantage. Open-hearth steel mills, by the use of waste heat units, generate steam sufficient to operate large plants.

*Read at the Cincinnati meeting of American Brass Founders' Association.
†General Manager Genesee Metal Company, Rochester, N. Y.

Why not brass foundries? Construction of plant, would, perhaps, be the first consideration. A plant would have to be constructed upon lines whereby all of the valuable points appertaining to the use of the waste heat could come in for consideration. I would suggest a core oven as one important factor; a suitable rack for skin-drying moulds would be another; or, like the steel mills, a steam plant sufficient to operate a tumbling barrel, a sprue cutter, a saw or emery wheels; or one may at least use the heat for producing hot water. That would add to the comforts of the help in washing up for supper after their daily toil.

There are a large number of foundries which are today using special oil-burning furnaces and forcing a tremendous amount of waste heat up through a tube to the outer roof. This waste heat could be made to do some work. Many things can be accomplished with this subject of waste heat if proper attention be given to construction and the proper laying out of the foundry. Of course it would work more advantageously in the larger plants, but in this present age it seems to me that there is nothing impossible.

In the presentation of this paper the writer does so with the full knowledge that waste heat is a very important factor in the larger plants. In our works we maintain a steam-heating plant caring for our entire offices with the waste heat of only two No. 200 crucible furnaces at an annual saving of $300 in fuel.



CLEVELAND AUTOMATIC TWO-JAW CHUCK.

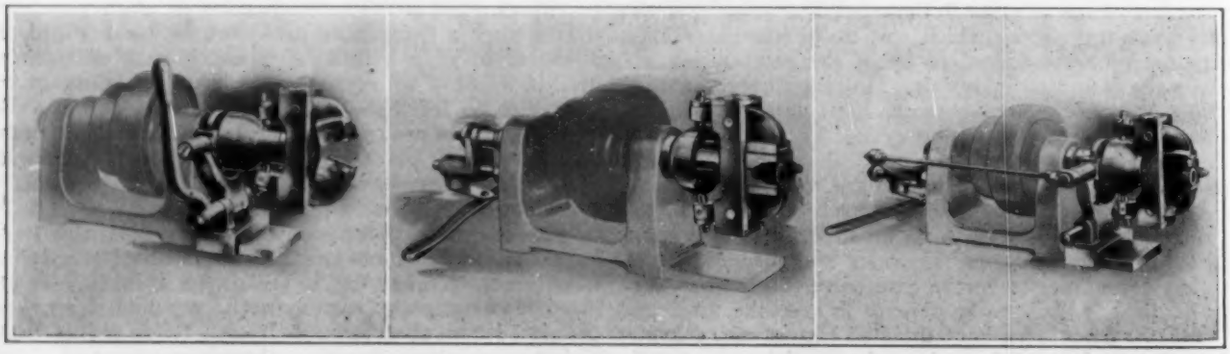
The chucks shown in the cut are manufactured by the Cleveland Chuck Company, 514 Garfield Building, Cleveland, O. They are made in three styles as shown and are claimed to be unrivalled for simplicity, durability, strength of grip and accuracy. The manufacturers say these chucks will increase shop output from 50 to 100 per cent. over the old style box chuck, and that they do the same work as an air chuck without the expense of installing an air system and cost of its maintenance.

Referring to the cut, style A is shown in the left. This chuck opens and closes instantaneously by lever arrangement through the spindle, and is used on hollow spindle lathes such as automatic screw or turrent lathes in connection with the same lever arrangement as ordinary spring collects are operated.

Jaws will remain true during constant usage because there is no half screw thread to wear out on right and left hand screw as on the ordinary two-jaw box chucks.

The operating jaws are made of cast steel, very carefully fitted in the chuck body and held positive and central by a hardened and ground centre pin screw. The slip or clamping jaws are interchangeable and can be adjusted quickly without trouble. The feature of this automatic chuck is the cushion plunger which is placed on the rear end of the operating jaw. With this new device the adjustment is made for different sized castings and after set properly for the first casting or part to be machined, the cushion plunger will adjust itself automatically to all pieces if the variation in size is not greater than one-sixteenth of an inch.

Through this new feature no matter how thin the wall of the casting or part should be, it will not injure or crush same. The jaws work parallel and to the centre, thereby enabling the operator to work to a positive stop. The construction of this chuck is such that it is positively impossible to make it inoperative by chips or dirt getting into the working parts. This improved chuck opens instantaneously wide enough to readily drop any machined article without the aid of one's right hand, therefore one can in the meantime hold another article ready to be gripped. Will take jaws used in present box chucks. Suitable for machines from 10-in. swing up, and will hold work from 0 to 3 in.



STYLE A. STYLE B. STYLE C.

For plain head machines an operating lever as furnished, to be attached to rear end of lathe head, same as used on automatic screw machines.

Style B, shown in centre of cut, opens and closes the same as style A, but is furnished with an open spindle which, by the use of proper jaws, will handle collet work. This chuck is recommended for factories where there are no automatics, as it performs the work of an automatic.

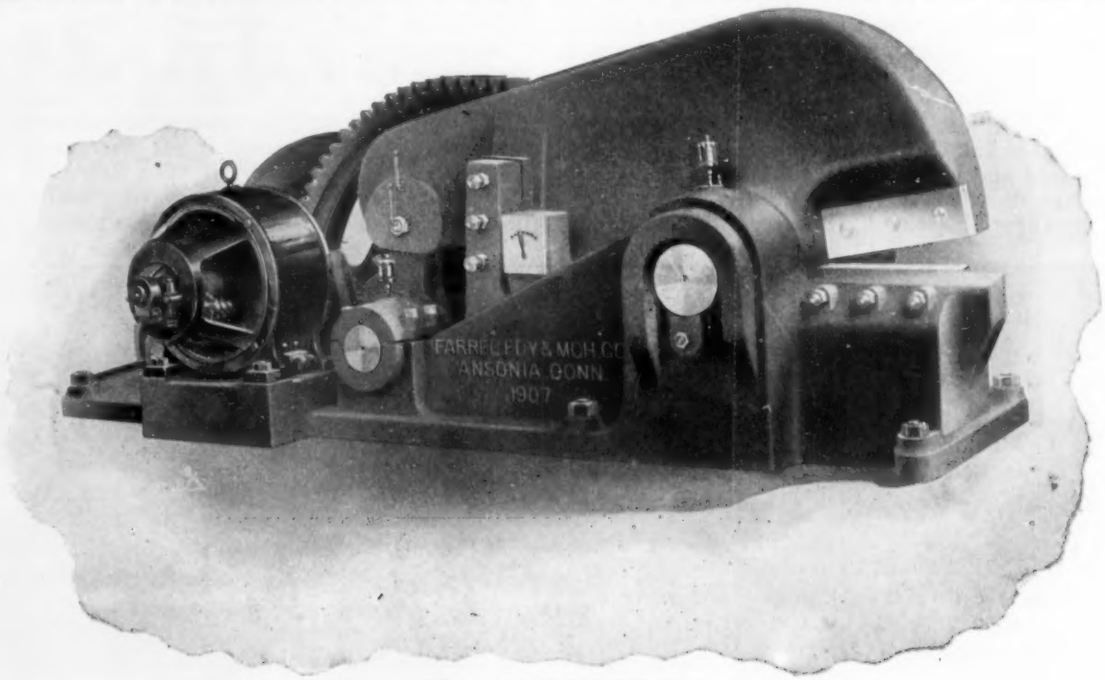
Style C, in right of cut, shows the automatic two-jaw chuck as arranged for plain head turret or solid spindle lathes, and is operated by a front lever. Prices of all of these chucks will be furnished upon application.

ALLIGATOR SHEAR.

We illustrate herewith a new design of heavy shear of the alligator type for cutting bar metal. This shear is of particularly heavy and substantial construction in every respect and designed for cutting up to a limit of 4 inches square cold steel. In this case the shear is driven by an electric motor, the motor being mounted upon part of the shear bedplate.

The lever is driven by crank and link, there being two pairs of back gears and a balance wheel. All the castings are made of best quality semi-steel and everything about the shear is designed of abundant strength for the work that it is intended to do. The shear weighs about 61,000 pounds without motor, and the blades are 24 inches long.

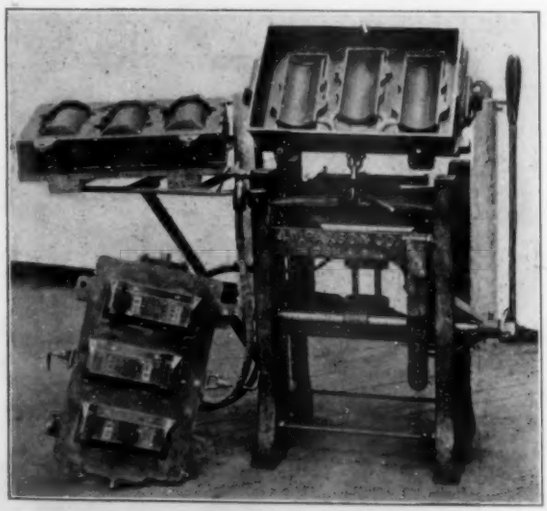
This shear, designated as No. 10, is used in many of the metal rolling mills for cutting off the "gates" of slab brass castings, etc., and is built by the Farrel Foundry & Machine Company, of Ansonia, Conn., U. S. A., who will be glad to furnish a circular of this and their other shears upon application.



NO. 10 ALLIGATOR SHEAR.

A BRASS ROLLOVER MOLDING MACHINE.

A new molding machine, particularly adapted for brass foundries, has been brought out by J. W. Paxson Company, Philadelphia, Pa., and was shown to the public for the first time at the Foundrymen's Convention, held at Cincinnati, O., during the week of May 17-22.



ROLLOVER MACHINE FOR BRASS.

While this machine, as shown in cut, is essentially a hand rammer, it can readily be equipped with a revolving head pneumatic rammer, and four machines can be served by the one head. The machine uses a straight or bevel flask up to 12½ x 20½ in., and thus offers great inducements, as it is possible to use the ordinary bevel-rimmed flask kept in stock in many foundries.

After the mold is rammed the lever raises the table, the mold is rolled over, unclamped, and the pattern raised by the lever. A ball and socket three-point leveling device ensures a perfect draft. The machine is equipped with an air vibrator and will use whole patterns by the employment of a match follow-board or a hard side. Split patterns may be used by placing on a plate. The cut shows cope and drag patterns of M. B. C. car brasses made in a straight side iron flask. Prices and circulars upon application.

HIGHER DUTY ON FLUOR SPAR.

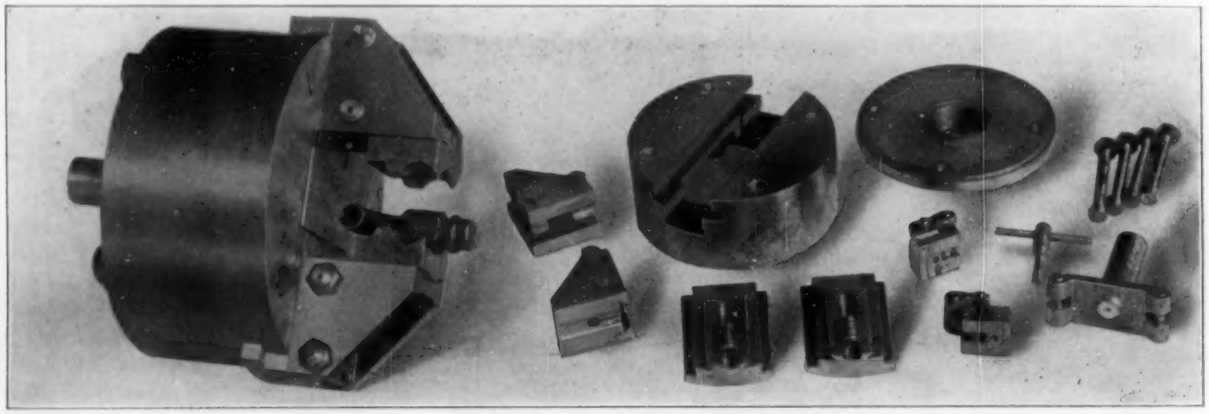
An important item in the brass foundry business is fluor spar, which heretofore has been on the free list. In the new tariff it will be subject to a duty of $3 a ton. This product comes chiefly from southern Illinois and Kentucky.

THE TWO-JAW UNIVERSAL AEROCHUCK.

This recent addition to the line of chucks manufactured by the Manufacturers' Equipment Company, of Chicago, Ill., is the outcome of the realization of the fact that the manufacturer in general is on the market for a chuck that is not merely rapid in handling work but also powerful and flexible. This device, as shown in cut, is constructed with a view to produce a chuck that has all the advantages of the old style box chuck, with the added feature of being opened and closed rapidly without the use of a wrench or key. The gripping power of this chuck is fully as great as that of the screw-operated box chuck, and is sufficient for holding properly iron and steel work, as well as brass goods, which class of work it was primarily designed for. When installing this chuck, the necessity for making entirely new false jaws is done away with, as it will accommodate any false jaws at hand, thereby materially reducing the first cost of installation.

The jaw plates, which carry the master jaws, are operated upon by toggle-joints, so placed as to exert the greatest pressure when the jaws are closed or nearly so. This arrangement has also the important advantage of taking up any and all variations that occur more or less in all castings. When operated by air pressure, the same style cylinder is used that has been the operating medium in the past. The advantage of using air to operate this chuck can be summed up in a few words, viz.: The constant air pressure upon the piston is of utmost importance, as without this feature the very object of using air is utterly defeated, which is the flexibility this method insures.

When using air constantly as described above, there is no more air consumed than that which is necessary to fill the cylinder between the piston and cylinder walls. This amount has to be provided whether using air constantly or shutting it off after each chucking operation. A hand lever is also furnished for this chuck that has almost the same degree of flexibility in operation as the air method. No chips or dirt can possibly get into this chuck as can be readily seen by referring to the half-tone.



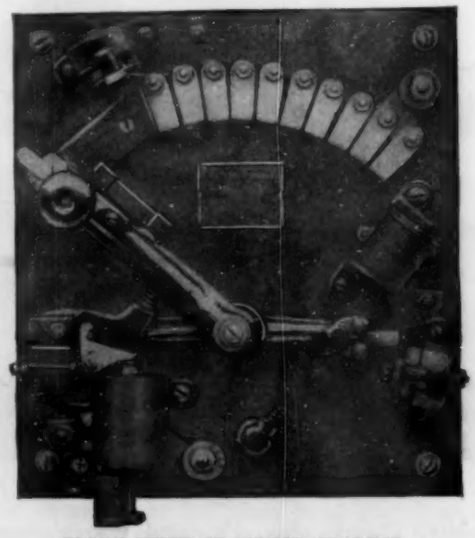
TWO-JAW UNIVERSAL AEROCHUCK.

These chucks are made in three sizes as follows:

	No. 0.	No. 1.	No. 2.
Capacity	2 in.	4 in.	6¼ in.
Distance jaws project..	2½ in.	3 in.	3½ in.
Largest outside diam..	7 in.	9 in.	12 in.
Length of chuck.....	7¼ in.	8¼ in.	8¾ in.
Approximate weight ..	27 lbs.	45 lbs.	60 lbs.

DUST-PROOF MOTOR STARTER.

The Ward Leonard Company, Bronxville, New York, manufacturers of electrical instruments, have placed upon the market a motor starter equipped with "tight cases enclosing all current carrying parts," for use in wet, dusty, linty or dirty places, where dust or combustible flyings would be liable to accumulate on them—replacing all types of dust-tight, fireproof enclosing cabinets. The cut shows the front view of this motor starter. It is duly approved by the underwriters. It is noted that the resistance portion is absolutely enclosed, and the face portion is enclosed; the lead wires come in through bushings. There is a piece of glass over the contacts in order that an operator can see the contacts. The starters are designed for plain no-voltage release, or for overload and no-voltage release, in which case the overload device is an independent interlocking overload circuit-breaker, giving absolute protection during the period of starting, as well as at all other times.



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THE FOUNDRYMEN'S CONVENTION.

Another convention has passed into history and become a memory. We believe that it made a lasting impression on the majority of its visitors and also that its success will cause many a manufacturer who merely attended this year, to decide to exhibit at the conventions to follow.

While the convention was a great success industrially and financially, there were one or two incidents in its practical working which it seems could be improved upon. The official registration list of members and visitors might have been a little more complete and included also the convention week address of the registrant so that he could be readily located by parties interested.

The sessions of the two educational societies, the American Foundrymen's Association and the American Brass Founders' Association, were held jointly, and while this proved a great success in the matter of larger attendance, the method of presenting the papers could be improved upon to some extent. Instead of alternating between brass and iron subjects, why not have all of one kind and then allow anyone who did not care to hear the other class retire? The members interested in all could of course remain for the entire session. By the present method there was a continual moving in and out by persons who did not care for one paper but wished to return for the next, etc., thus causing a disturbance, distracting the attention of the listeners and disconcerting the speaker.

Another point, it seems to us, could be observed and that is to follow the procedure of the large engineering societies in reading the majority of the papers by title, thereby allowing more time for discussion. The papers should be submitted to the secretary far enough in advance of the meeting to allow him to have them printed and mail copies to each member, requesting him to either mail a criticism or bring it with him, if he intended to attend. Then at the meeting when the particular paper is announced every one is primed for discussion; thus much time is saved and more discussion assured.

Of course papers that can be illustrated by moving pictures or lantern slides should be read and ample provision for this feature should be made beforehand in order to allow for all possible contingencies. Where a paper is quite technical and lengthy it requires a careful perusal and study in order to intelligently criticise or comment upon it, and when one hears it read perhaps by some one other than the writer and one who is not familiar with the saliant points the argument naturally loses much of its intended force

and the resulting discussion is apt to be weak and desultory.

While we are in this critical mood it may be well to express ourselves regarding what might be termed the "promptness of the exhibition." By that we mean in getting ready. Have the exhibition begin on the first day set for it. Let every one intending to exhibit get his stuff on the spot and be in readiness to do business on the opening day. A number of exhibitors at Cincinnati were heard to remark that they were only really beginning to do any material business on the last two days of the week.

The Entertainment Committee, while it should be heartily congratulated on the results of this work in the interest of the visitors, made a mistake in setting Thursday for the festival way. Many an attaché of an exhibit or delegate to the convention was placed on the horns of a dilemma as to whether he ought to leave the hall or not. The rain solved the question for some, but had the day been fair and a Saturday instead of a Thursday, a rousing time would have been had by all without any misgivings as to loyalty to business interests.

The benefits to be derived from such a gathering are many, and each year sees more and more interest shown in the getting together of like industries, and the 1909 convention was no exception to this rule. With an attendance of over 2,500 the interest was intense and unabated from start to finish. There is no disputing the record made and the 1909 Foundrymen's Convention has set a standard which the future meetings will have a hard time to equal or excel, but if all signs read aright Detroit is going to make a strong effort to surpass it in 1910.

THE FOREMAN'S ASSISTANT, HOW SHALL HE ADVANCE?

The assistant to the foreman in a plating or other establishment has under ordinary conditions a difficult position to maintain. He must perform his work in a manner satisfactory to his superior and also take an interest in his work and be eager to advance. On the other hand, he must not seem to have any very strong foremanship aspirations, else he is looked upon with suspicion.

Why should this be? Should he not be encouraged in every possible way to advance himself in the line of work he has chosen? He certainly should, for it is from the ranks that the head must come. Our leaders cannot live forever, and who shall take their places but the assistant. A man in charge of an entire plant or only a department can only reflect credit and reputation upon himself by the excellence of his teaching, and the quality of the work he produces depends largely upon the skill of his assistants and their ability to carry out his instructions.

A man, expert in his line and superior in his executive ability, need never be afraid to teach and fit his assistants for higher positions. There are isolated cases, it is true, where an assistant has superceded his foreman, but this was bound to happen anyway, due possibly to some outside conditions, or perhaps some weakness developed in the foreman himself.

There are several ways by means of which a young man either with or without college training can consistently advance himself. He can continue to study and read current literature. He can study the methods and practices of his superiors and associates of more practical experience. Lastly, he can or should be able to join the societies and associations devoted to the advancement of the particular art he is engaged in.

All the large engineering societies encourage the assistants in the various lines by allowing them membership in the associations. In this way the younger members come in contact with men of tried and true reputations and the intercourse is valuable and results in a broadening and developing of the junior, NOT at the expense of the older man, but rather to his benefit and relief, for he knows there will be some one to take up his work when he lays it down.

This same practice should be carried out in the associations formed for the advancement of industrial pursuits, let the young men in, encourage them to seek for more knowledge and to get at the theory that is coincident with practice. Where a foreman adopts the idea of secrecy and aims to puzzle his assistants with the mysteries of science, nine times out of ten it is because he is actually not sure of himself and is holding his own position by means of some pet process that he fondly imagines is known to himself alone.

In these days of progressive investigation the secret process is rapidly becoming an open book and it is experience and latent inherent qualities that make one man better than another in some certain line of work. A good man is bound to rise, and the more obstacles in his path, the more determined he is to get to the top, and go up he does.

"Knowledge is power" is undoubtedly true, but it is knowledge born of experience that is the power behind the throne, and no man is capable of doing more than his experience has taught him and there is no man so expert but that he can learn more the older he gets. Let the young man in so that he may become broadened in his knowledge and ideas and aid in the general development of industrial processes that are just now beginning to reconcile theory with practice.

A foreman has been heard to say in this connection: "Do not let an assistant join an association of which a superintendent or foreman is a member, for it would be embarrassing to the latter to have to admit ignorance or perplexity in the presence of the former.

Let the assistant work out his own salvation as we have done." This sounds all right—to the foreman, but to the world at large it smacks a little of a narrow gauge view. When the foreman was getting his experience there were doubtless not the openings to be had for enlightenment that there are today.

No man need be ashamed to admit honest ignorance and judging from the state of some of the arts in their relations of science and practice, it is not at all surprising that we should hear some expressions as above quoted. Let the industrial associations be formed and make the constitution so broad and liberal that it will allow the admission of any one, who is honestly in earnest and will strive to aid in the work of solving difficult questions, thus by his interest and co-operation, helping others and himself at the same time.

NEW BOOKS.

Alloys and Their Industrial Applications. By Edward F. Law, Associate of the Royal School of Mines. 8vo. 270 pages—99 illustrations. Price $4.00. Charles Griffin & Company, Ltd., London. J. B. Lippincott Company Philadelphia. 1909.

This is a most valuable work to not only the student of alloy making, but also the practical metallurgist. The book consists of twenty-six chapters, covering the influence of mechanical, thermal and chemical treatments in not only iron and steel, but also on the non-ferrous alloy.

A great portion of the work is new, and gives very important data as to the micrographical structure of the various alloys treated. The chapters devoted to the copper alloys, brass and bronze and special alloys give some interesting information and micrographs.

There is also included tables giving the properties of copper-zinc alloys, collated by the Committee on Alloys appointed by the United States Board in 1881. The diagram giving freezing point curves have in most cases been taken from commercial rather than laboratory samples, and are plotted to a uniform scale.

The color photographs reproduced in the frontispiece, illustrating the heat treating of alloys, were taken by the author on Lumiere autochrome plates, and were the first examples of the practical application of color photography to metallography.

Up-To-Date Electro Plating Hand Book. By James H. Weston. Illustrated by L. Elliot Brookes. 12mo, 180 pages, fully illustrated. Price $1.00. Frederick J. Drake & Company, Chicago, Ill. 1905.

This is a compilation of facts, figures and directions relating to the art of electro-deposition calculated to aid the practical plater. The subject matter is arranged in such a way as to be readily understood. The descriptions of processes and construction of apparatus are gleaned from the experience of practical platers and therefore can be relied upon as reliable and up to date.

The book is valuable to platers and others who wish to become acquainted with the practical side of electro-deposition of metals. The various departments of the industry are treated in a not too technical manner, which gives the work additional interest.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES
PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

HEALTH CONDITIONS IN THE PLATING ROOM.

To the Editor of THE METAL INDUSTRY:

Regarding plating problems there seems to be no more important topic to consider than the conditions that at present prevail in the average plating room, and there seems to be no better way to rectify the evils that are presented to the platers than through the pages of THE METAL INDUSTRY.

Few if any of us have not encountered rooms where the ventilation was so bad that the fumes from the dips, hot copper and electro cleaners, actually hung in clouds in the room, so that the employees from other departments could not stand the overpowering odors. While I do not claim that these conditions are encountered in all shops, I know of many platers who are working under such conditions, and they can be found among manufacturing establishments whose names and goods are known throughout the entire country.

I have seen men working where the cyanide fumes filled the whole room and settled in such quantities upon the pipes as to whiten them. I have seen men in this room so affected that it incapacitated them for weeks, and the effects were so painful that breathing was a difficulty. In one of the large plants of Connecticut I have known the platers to be covered with the most disgusting sores, over more than half of their body, and the head plater in this room was carried out, completely prostrated from the fumes of the hot cyanide solutions, and when I accepted a position there, was informed by many that this was only one case of several that had occurred in that room. And yet, in that large plant there were rooms that would have been ideal for a plating department that were used to store goods in.

I have talked to a number of platers who have encountered the same conditions I have tried to picture, and have concluded that the only way to counteract such treatment is by publicity and a wide discussion by the men who have been compelled to suffer through the shortsightedness of the managements.

I believe that the laws should be made as stringent as those passed by New Jersey regarding blowers in the polishing rooms of that State; and I do not believe a plater should be allowed to run hot cyanide or electro cleaning solutions without a good ventilation or hood for each and every tank.

Should inspectors familiar with the requisites be appointed by law? Should the inspectors of polishing room conditions be instructed to include in their investigations all plating rooms? or should places where these conditions prevail be well advertised as permitting such inhuman methods to exist? These are, I believe, the most serious points for discussion that should be considered by every plater who knows them to be in existence, as I do, in at least four States within 100 miles of New York City.

B. W. GILCHRIST.

Woodhaven, L. I.

FOUNDRY ECONOMY.

To the Editor of THE METAL INDUSTRY.

By the use of molding machines one can successfully and economically make a better grade of castings either in green sand or in faced molds, than by hand, and with very little extra cost in patterns; whether on plates or loose. By the use of the vibrator frame, the snap flask can be used for brass as well as for iron.

Structural work is now being made in very large sizes. Builders and shelf hardware, plumbers' supply materials and many other kinds too numerous to mention are also being manufactured by the application of the molding machine, the castings produced being uniform in shape and character with good smooth surfaces. In the finishing also considerable time is saved compared with the hand-molded article. I am not casting any reflection on the molder, but the truth must come out. The molding machine has come to stay and the improvements which are sure to follow from time to time will surprise the most skeptical.

But where will the foundry foreman of the future come from? His knowledge of metals and their mixing will be limited for the reason that he did not have a chance to learn. The principal factor in the success of a foundry is the furnace. This, if properly handled, will give the best of results. The writer knows from personal experience that there are more castings spoiled through the improper handling of the metal than from any other cause.

W. B. JONES.

Providence, R. I., June 10, 1909.

Shop Problems

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

ALLOYING

Q.—We would like to know how to make "Tobin Bronze."

A.—"Tobin Bronze" will run anywhere from 57 to 61 per cent. of copper, from 37 to 40 per cent. of zinc and from 1 to 2 per cent. of tin. The varying amounts of lead and iron are simply due to what may be introduced in the case of the lead by the zinc, and in the case of iron by the zinc and also the iron stirring rods used in melting the mixture. If you are prepared to make any sort of metal there is no reason why you should not make this mixture yourself advantageously. We should advise you to make up a mixture of:

Copper	60
Zinc	39
Tin	1

To make this so that it will produce the metal with the proportions given, out of the fire, weigh out 60 lbs. of copper and 40 lbs. of spelter and 1 lb. of tin. Melt the copper first and as it becomes reduced to a semi-molten mass, cover it with charcoal broken to horse chestnut size, close the furnace and allow to come to a fairly good heat, but not boiling, then gradually and cautiously feed in the spelter, giving the mixture a careful and thorough stirring. Be sure that the crucible is not filled to within more than 2½ inches of the top, and keep the melted metal well covered with a layer of charcoal. When the melt is just hot enough so that a strong vibration can be felt by the hand, while holding a stirring rod in the pot, take from the fire and drop in the tin in small pieces, stir thoroughly and after skimming it clear the metal is ready to pour.

As the small amounts of iron and lead are not objectionable, but rather aid in making the metal tough and strong, it is not necessary to use better than an ordinary Western spelter. All of these spelters carry about one per cent. of lead and iron from .2 to .75.

CLEANING

Q.—We would like to know what would be best for cleaning nickel-plated hardware after it has been buffed and polished.

A.—Dip in a 10-gallon solution of soap suds containing a small amount of ammonia, then transfer to boiling water and either wipe or allow to dry naturally.—J. D.

COLORING

Q.—Can you inform me of some chemical to add to a Roman gold solution that will impart a dark yellow color to deposit? Would you advise the use of picric acid to produce same, in a solution containing caustic soda, cyanide potassium, neutral chloride of gold, aqua ammonia, 26 per cent., and water?

A.—Picric acid will probably answer your purpose, as this substance is a color used for dyeing some classes of goods and contains free acid. It may have a tendency to darken the color; it would be advisable to experiment with a little of your solution first. A little red prussiate of potash added in the place of picric acid may also assist in producing a darker gold color. Chloride of iron will produce a dark tone to gold solutions when added in small quantities, but in each case care must be used to avoid spoiling the bath with an excess.—C. H. P.

DEPOSITING

Q.—I am having considerable trouble with a steel depositing solution; the enclosed sample will show you just what I mean. You will notice that the deposit is very streaky. In making this solution, it stood 4 degrees Baumé and I used a current of 3½ volts. Have reduced the current to 2 volts, but without sucess.

A.—The trouble you are experiencing is probably due to an excess of free acid which forms in the bath, due to the fact that the anodes do not reduce fast enough to replace the iron deposited. If you had used the double sulphate of iron or ammonia solution the results would be far better. We would advise you to add 4 to 6 ozs. of commercial ammonium sulphate to each gallon of solution and occasionally a few ounces of ammonium citrate. Another good formula consists of the following:

Commercially pure sulphate of iron	5⅓	ozs.
Sal ammoniac	13	"
Water	1	gallon

A deposit of the basic salts of iron frequently occurs at the anode, which sometimes interferes with the good working of the bath; in such cases add 3 ozs. of ammonium citrate to prevent this.—C. H. P.

ETCHING

Q.—Please answer the following: (1) What is coal tar asphaltum, and where can I obtain small quantities of same? (2) Please give the exact proportions of asphaltum and beeswax to be used together for filling in of name plates. (3) What are the exact proportions of beeswax and turpentine used for coating gilding metal for etching?

A.—(1) Coal tar asphaltum is sometimes called coal tar pitch; it is a hard, brittle, black substance which can be broken easily. Some tar roofing concerns handle this product. (2) From 3 to 4 parts asphaltum to 1 of yellow beeswax. (3) Beeswax and turpentine are melted together by the aid of heat so that when articles are coated by the melted beeswax and turpentine a thin coating results when the surface becomes cold. The proportions would be 1 part beeswax to 8 parts of turpentine by weight.—C. H. P.

FINISHING

Q.—I would like to have you publish a formula for a bright green stain on brass.

A.—The finish that you refer to is probably what is known as the Japanese bronze and Verde finish. This finish is produced as follows: The articles are copper plated in the cyanide of copper bath, and then slightly oxidized in a dilute sulphuret of potassium solution, ½ ounce of the sulphuret and ¼ ounce of ammonium sulphate to each gallon of water, used cold, then dried ont carefully and scratch brushed dry with a very soft or much worn brush to produce a lustre. Then lacquer with a good heavy half varnish dip or brush lacquer, allow to dry and then harden for several hours. Then apply a light, medium or dark chrome green color; this is mixed with turpentine and a little turpentine copal varnish for a body (not more than a teaspoonful in ½ pint of the color), apply to the lacquered surface evenly with a camels-hair brush ½ inch size; place upon the lacquer heater for a few minutes until warm. The color dries rapidly, and if the right amount of varnish is used, will be a dead lustre; too much produces a painty effect. When again cool remove the color from the high lights with a mixture of 2 parts boiled linseed oil and 1 part turpentine, using soft, clean rags for the purpose. The color removes easily and does not affect the lacquered bronze surface. After removing the color, the high lights should be gone over again with a clean rag moistened with a little of the oil mixture. These colors are very effective, and can be produced in any shade.—C. H. P.

FLUXING

Q.—What effect has salt used as a flux on brass or bronze, also which is the best to use, salt or fluor spar?

A.—For brass which is melted in a crucible, salt makes the most effective flux; its action is to collect the oxide of zinc already formed and thus forming a coat on top of the metal, prevent further oxidation. Fluor spar should be used when brass is melted in an oil reducing furnace, as the temperature there is usually too high to admit of the use of salt.

LACQUERING

Q.—Please give us a formula for making an odorless lacquer.

A.—You can probably produce as near an odorless lacquer as is possible to get by dissolving gun cotton in alcohol. This would give you a good flexible coat. When lacquer has become thick by evaporation it can be diluted with wood alcohol, or benzine, both of which would have to be of the deodorized variety to meet your requirements, of course, and acetate is the best known solvent for gun cotton, for this is the banana odor which you probably want to avoid. A mixture of deodorized benzine and acetone might be devised for use as a thinner.

MELTING

Q.—We contemplate running into ingots a quantity of aluminum turnings, and as our experience is somewhat limited in this kind of work, we write to inquire if you know of some method of doing this, economically, and with the least possible loss. Whether it would be advisable to melt them in crucibles or a kettle, and what kind of flux to use with it.

A.—Aluminum turnings are best melted in a crucible in an oil melting furnace. When the latter is used it can be brought to the proper heat, the blast shut off and the turnings then introduced. If the quantity is not too great no further blowing may be required. It is best to form a bath by melting some heavy aluminum scrap and then add the turnings to this, pushing them under the surface. As a flux, equal parts of common salt and fluor-spar should be used.—J. L. J.

PICKLING

Q.—Please give us any information you can regarding the use of hydrofluoric acid for pickling?

A.—Hydrofluoric acid gives off a very penetrating, invisible vapor whether in use or not and should be kept from the vicinity of machinery or finished goods, especially if used in large quantities. No especially obnoxious fumes are given off while acting on iron other than the odor always present in the vicinity of the acid and which must resemble that of a freshly lit sulphur match. Whether castings need to be dipped in alkali before plating depends entirely on the length of time they have been immersed in the acid and its strength. Ordinarily it should not be necessary, if a thorough rinsing in running water can be obtained.

The standard solution of hydrofluoric acid usually requires a dilution of 1 volume of acid to 20 of water when used lukewarm and this generally gives most satisfactory results. Some work requires more acid even to a six to one solution and if facilities for keeping warm are not available about 12 to 1 in cold water will give good results. A little practice in handling this acid will soon furnish a reliable guide. If you have occasion to use large quantities it will pay you to have two sets of vats and to decant the liquor from the settled solution frequently so as to remove the settlings and the exhausted acid which remains at bottom of vat. If you buy the barrel, see that barrel is immediately set into a lead-lined tank large enough to catch and hold the contents, as the acid has a trick of eating through the containing barrels unexpectedly. Most concerns buy in 100 lb. lead carboys, preferring to pay the higher price for the increased security. Either lead-lined or pure asphalt-lined tanks will be suitable for pickling purposes and we believe you will prefer the acid to the sulphuric or muriatic after you get accustomed to it.—W. L. C.

PLATING

Q.—I would like you to inform me how to make a brass solution plate bright without scratch brushing. 2.—Is it possible to make a bright silver finish by a dip solution?

A.—1.—The following formula will give a good, rich and clear brass deposit for novelty work:

Carbonate of copper	5 ozs.
Carbonate of potash	2 "
C. P. cyanide of potassium	10 "
Water	1 gal.

Use about 9-10 of the cyanide first; this gives an excellent copper finish; the solution can be increased to 2 gallons without any further additions for light deposits. To prepare a rich brass solution, dissolve 1 part carbonate of zinc in 2 parts cyanide of potassium, in as little water as possible, and add to above solution until the brass color is produced. For a light colored brass, add a little carbonate or water ammonia.

2.—A very bright dip silvering solution can be made as follows: For brass, bronze, copper or heavily plated articles, dissolve in warm water, bisulphite of soda until 22 degrees Baume (this will necessitate the use of 2 lbs. or more to the gallon of water). The solution will show acid to the test of blue litmus paper; add a little saturated solution of carbonate of soda until the solution is neutral to test paper. Now dissolve nitrate of silver in water, producing a concentrated solution; add the nitrate of silver solution to the soda solution as long as the sulphide of silver formed is taken up, when the solution is ready for use. The solution produces the best results for whiteness and brightness of all dip silver solutions.—C. H. P.

POLISHING

Q.—We are users of large quantities of liquid metal polish. Can you give us a mixture for same? What we are now using is semi-fluid, smells strongly of ammonia, and has a pink color.

A.—We are not prepared to say just exactly what the liquid metal polish you are using is composed of, but we are of the opinion it consists of the following:

Water	1 pint.
Whiting	4 ozs.
Water ammonia	2 "
Hyposulphite of soda	2 "

A little jewelers' rouge or fast aniline red to give the pink tint. The whiting must be very finely powdered to prevent scratches. If it is desired to perfume the polishing liquid, a few drops of oil of mirbane or oil of citronella, will make it more pleasing to the user.—C. H. P.

REPLATING

Q.—Will you please publish a formula for replating knives and forks, etc., with something cheaper than silver?

A.—The Royal silver dipping method advertised by several concerns is accomplished in the manner you mention. The molten metal is applied to the cleansed articles previously dipped in a chloride of zinc flux. The metal is a fusible alloy melting at a temperature of 210 degrees or more and consists of:

Bismuth	8
Lead	8
Tin	3

The metal can easily be melted over a lamp or gas flame. Articles coated in this manner look somewhat like silver and have a very good appearance, but owing to the amount of lead used darken rapidly by use or when washed in water containing soda or any alkali.—C. H. P.

TINNING

Q.—Will you kindly inform me of a good electric tin bath. One that will plate quick and will buff same as any other plate?

A.—Prepare a warm tin bath consisting of 6 ozs. of cream of tartar and 1 oz. of chloride of tin in each gallon of water; use anodes of pure tin. Use a current strength of 3 to 4 volts; cleanse

the work in the regular manner. A good coating can be obtained in 20 minutes, if a bright lustre is desired; after plating scratch brush with a soft steel brush or polish on a soft buff wheel, using Vienna lime and kerosene oil.—C. H. P.

Q.—Can you advise us of some good method for tinning sheet brass and copper, other than dipping in molten tin?

A.—Take 4 ounces of cream of tartar, 1 ounce of chloride of tin or tin crystals, dissolve in a gallon of water heated to 160 degs. F. and run with a little current of electricity, using tin anodes. This should give you a good firm coat of tin. If the solution should not plate quite fast enough, gradually increase the current. The solution should be kept between 5 and 6 degs. B.

SILVERING

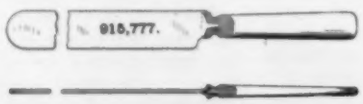
Q.—What is the method for dip silvering steel pens?

A.—The method to pursue in dip silvering steel pens is first to tumble them in macerated leather meal to produce as bright a lustre as possible, then lightly brass plate them; the deposit should be clear and bright; half a minute deposit should be sufficient (very little cleansing is necessary; a warm cyanide dip or warm sal soda solution will be sufficient before brass plating). The silver dip should be prepared as follows: Dissolve ¼ ounce of nitrate of silver in each gallon of warm water, then add just sufficient cyanide to absorb the silver, using care not to add any in excess; ½ to ¾ ounces should be sufficient. The solution is then ready for use; the temperature should be 100 to 150 degs. The pens should be placed upon small frames or strung upon copper wires, or any suitable method may be used; after brassing the pens should be washed in cold water, then immersed in the silver dip for a second or two, moving them to and fro during immersion. Too long an immersion produces a more dullish and slightly yellowish tone; afterward wash in cold water, which should contain about 2 ounces of plater's compound to the gallon; afterward dry out by the aid of warm maple sawdust.—C. H. P.

PATENTS

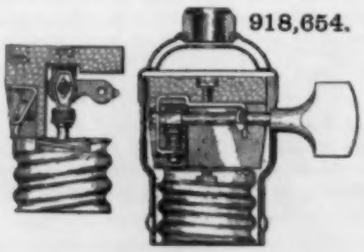
REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

915,777. March 23, 1909. Method of Attaching Steel Blades to Solid White Metal Handles. Thomas B. Lashar, Bridgeport, Conn., assignor to International Silver Company, Bridgeport, Conn. As is well known, the most satisfactory blade for table, fruit and other knives is a steel blade, because of the difficulty to retain a cutting edge on any other metal. The great difficulty in the way of making both handle and blade of steel is the fact of the great weight of the handle and also that it corrodes. The object therefore of this invention is to provide



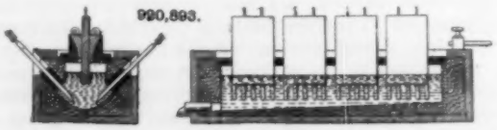
a means of attaching the handle of white metal, light in weight and non-corrosive to the steel blade. This is done as shown in cut by swaging the metal of the handle about the base of the blade and the outwardly tapering tang which is dove-tailed.

918,654. April 20, 1909. Lamp Socket. John R. Byrne, Schenectady, N. Y. The object of this invention, as shown in cut, is to provide a key lamp socket, having a phosphor bronze spring of special mixture and design, that will be of better efficiency and last longer than the kind now in use. The general make-up of this socket consists of a key with a bearing yoke having an aperture at one end, a spring pressed plunger is



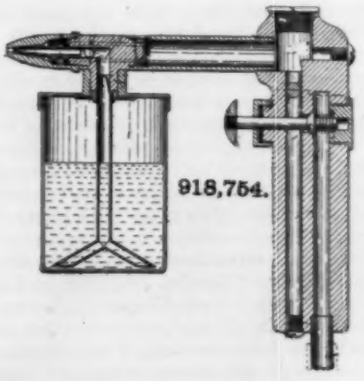
slidably mounted in the opening at right angles to the key. A screw shell contact with a flexible flange is engaged by the plunger.

920,893. May 4, 1909. Art of Extracting Aluminum and Other Metals. Henry S. Blackmore, Mount Vernon, N. Y. A method of extraction based on the employment of the device shown in cut, and produces aluminum in its metallic form from a mixture of aluminum flower and oxygen. The



process briefly consists in reducing the mixture to a fused state by the alternating current and then subjecting the fused mass to the action of the direct current, with or without the pressure of an augmenting reducing agent, capable of uniting with the electro negative elements liberated.

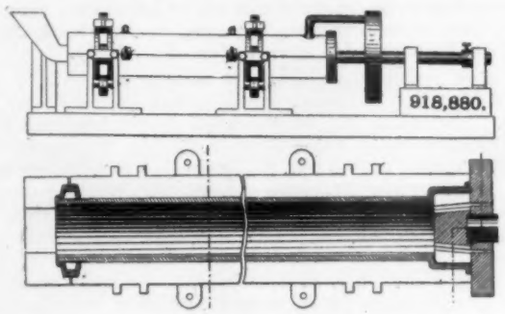
918,754. April 20, 1909. Air Brush. Frederick J. Lederer, Buffalo, N. Y. An improved form of an air brush of sim-



ple and compact construction, in which all of the parts are so connected as to be readily taken apart and cleaned without trouble. As shown in cut, the discharge nozzles for the liquid and the air to the brush are so connected that both nozzles can be attached to and detached from the brush at the same time. The discharge ends of the nozzles will at all times register with each other, thus permitting the employment of nozzles having any desired shape at their discharge ends.

911,459. February 2, 1909. Apparatus for the Manufacture of Lead Encased Wire. Charles Latham, New York, N. Y. This is an apparatus for encasing wire cables with lead for the purpose of protection from moisture and other short-circuiting causes. There is danger when encasing electric wires or cables with lead in injuring the wire, and also of water becoming mingled with the lead. All of these objectionable features are avoided in this device which contains a reservoir containing the lead so arranged as to exclude moisture, and a conduit which acts as a cooling medium to keep the lead at the proper temperature as it is forced about the cable. The cut shows the construction.

918,880. April 20, 1909. Machine for Molding Tubes. Francis Marsillon, Mexico. An improved machine for the manufacture of tubes of all kinds by means of centrifugal force without the use of sand or clay molds. By the use of this method tubes



are produced without cracks due to shrinkage, and also having walls of uniform thickness. In the cut the upper figure shows the machine, and the lower the mold, which consists of two halves bound together with a metallic expansible strip, is capable of being rotated rapidly in order to form the finished casting.

919,415. April 27, 1909. Keyless Padlock. Orson J. Blakesley, Denver, Col., assignor to the Blakesley Keyless Padlock Company, Denver, Col. This is a padlock, as shown in cut, designed to be used without a key. It consists of a casing containing a series of spring-actuated pins, mounted to reciprocate in the casing and having exposed outer extremities. Each pin is provided with a number of recesses which are out of register with each other. The pins being mounted to rotate

whereby the recesses of one of the pins may be brought into register with one another, but out of register the corresponding recesses of the other set, a locking part being adapted to engage the recesses of one set of pins, while it is locked against movement by the other set. By these means any number of combinations can be made, and no one can open the padlock unless the correct pins are pressed upon. Pressing upon the pins not in the combination only results in a tightening up of the lock.

917,285. April 6, 1909. Manufacture of Aluminum Foil. Alfred Gautschi, Gontenschevil, Switzerland. A method of making foil of aluminum of a thickness of less than 1/10 millimeters. By this process aluminum is first rolled from 1 millimeter in thickness to 3/10 millimeters on a mill of any suitable type. The sheet is then folded in two upon itself and rolled until its length is doubled upon a mill, the cylinders of which are perforated along their axes and heated by hot water at a temperature of 57° F. The sheet is then unfolded and its surface coated on one side by a solution of oil and water, two parts of oil and one of water, and then folded with the coated surfaces in contact and rolled as before. The operation of coating and rolling is continued without annealing until the desired gauge has been reached, when the pack is annealed, cut and separated as foil. The compounding of the oil and water to form a soluble mixture is kept secret.

919,031. April 20, 1909. Process for Rendering Material of Any Kind Proof Against the Action of Moisture and Chemical Agents. Abraham Kronstine, Karlsruhe, Germany. A process for imparting to materials of any kind such a high degree of consistency that they will even withstand the action of acids and dilute alkalis at an elevated temperature. The objects of this invention are obtained by applying to metal, etc., a coating of Chinese wood oil and heating the latter to a temperature sufficient to transform the oil into an insoluble isomeric form.

920,861. May 4, 1909. Resistance Material. Henry Susenhover, Schenectady, N. Y., assignor to General Electric Company, New York. The patent covers a process for the manufacture of a resistance stick in which the metal aluminum is mixed with other materials which constitute a binder. Aluminum in the form of a flaky powder is thoroughly mixed with calcium hydrate and silica. The mixture is then subjected to compression and treated with steam at a pressure of 150 lbs. The steam converts the calcium hydrate and silica into a hydrous silicate, which thus makes a hard and solid binder.

918,551. April 20, 1909. Molding Machine. Walter H. Hofman, New York.

918,770. April 20, 1909. Grinding Machine. Ernest Sachs, Scheveinfurt, Germany.

918,798. April 20, 1909. Method of Ornamenting Glass. John Tully, Chicago, Ill.

919,136. April 20, 1909. Device for Making Castings. Hugo M. Davison Hubbard.

919,646. April 27, 1909. Transmitter for Impulse Driven Clock Systems. F. M. Schmidt, Brooklyn, New York.

919,647. April 27, 1909. Feed and Positive Lock for Clock-Trains. Frederick M. Schmidt, Brooklyn, New York, assignor to Self Winding Clock Co., New York.

919,892. April 27, 1909. Alarm Clock. E. B. Lapham and James Walker, New York, assignors to Seth Thomas Clock Company, Thomaston, Conn.

920,080. April 27, 1909. Multiple Drill. Charles H. Oslund, Worcester, Mass.

920,143. May 4, 1909. Revolving Furnace for Volatilizing Zinc Ores. Harry H. Hughes, Springfield, Mass.

920,332. May 4, 1909. Method of Manufacturing Sublimed White Lead. L. S. Hughes, Joplin, Mo.

920,473. May 4, 1909. Distillation Furnace. Woolsey McA. Johnson, Hartford, Conn.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

NATIONAL ASSOCIATION OF BRASS MANUFACTURERS.

President, Joseph H. Glauber, Cleveland, Ohio; Commissioner, William M. Webster, Chicago, Ill. All correspondence should be addressed to the Commissioner, William M. Webster, 1110 Schiller Theatre Building, Chicago, Ill. The objects of the Association are to promote in all lawful ways the interests of firms engaged in the manufacture of brass goods. Meets every three months. Each meeting fixes the place and date of the meeting to follow, consequently there is no stated place. It has been customary for the Association to hold its Annual Meeting in New York City, but the last meeting was held in Philadelphia. The Semi-Annual Meeting is generally held at Atlantic City or some other seacoast town.

Commissioner Webster reports a very successful meeting of the association in Buffalo, N. Y., May 17 to 19, inclusive. The report of the List Committee, which had been nearly a year in preparation, was adopted. The report was ordered published in catalogue form and distributed to the jobbing trade as heretofore. The list will go into effect Sept. 1, 1909. Some new members were taken in, and a number were added to the National Committee. The meeting adjourned to meet in Detroit, Mich., Aug. 24 and 25, 1909.

At the last monthly meeting of the New England Foundrymen's Association held at the Exchange Club, Boston, May 12, W. H. Carpenter, of the Bristol Brass Company, Bristol, Conn., addressed the members on the subject of brass and its preparation and handling in the foundry, etc. The address was followed by discussion in which several of the members took part. For the next meeting a more elaborate programme than usual has been prepared, it being the semi-annual meeting of the association.

NATIONAL ELECTROPLATERS' ASSOCIATION OF UNITED STATES AND CANADA.

President, Chas. H. Proctor, Arlington, N. J.; Treasurer, Nathan E. Emery, New York, N. Y.; Secretary, Benj. W. Gilchrist, Woodhaven, N. Y. All correspondence should be addressed to the Secretary, Benj. W. Gilchrist, Box 26, Woodhaven, N. Y. The objects of the association are to promote the dissemination of knowledge concerning the art of electrodeposition of metals in all its branches. Meets the first Friday of each month, 8 p. m., at the Hotel Chelsea, 222 West Twenty-third street, New York City.

The third regular meeting of the association was held at the Hotel Chelsea, 222 West 23d street, New York, on Friday, June 4, 1909. There was an attendance of 33 members and guests. Considerable discussion developed regarding the status of an associate member, and it was finally decided to leave the matter in the hands of the Executive Committee. Thirteen proposals for membership were acted upon, and resulted in the election of three active, four associate and three honorary members, the last being Dr. Wm. Jones, 310 Fourth avenue, New York; G. W. Cooper and Thos. E. Trumbaur, 61 Beekman street, New York. Three proposals were held over for investigation by the Advisory Board. The Committee on Incorporation reported progress, and the Printing Committee was instructed to prepare a pamphlet setting forth the objects and advantages of the association.

The matter of a design for an emblem was continued for another month to allow the members to submit ideas. Mr. Hogaboom, the librarian, announced that if any member would submit to him any question for discussion, he would arrange for same. The subject decided upon for the next meeting, Friday, June 25, was THE USE OF AND ELIMINATION OF EXCESS OF ARSENIC IN A BRASS SOLUTION.

PERSONALS

ITEMS OF INTEREST TO THE INDIVIDUAL.

W. J. REARDON—MASTER FOUNDER.

We are pleased to present herewith a short sketch of W. J. Reardon, master founder, for he is certainly entitled to this distinction, having had charge for a number of years of the largest brass foundry in the United States, that of the Westinghouse Electric and Manufacturing Company at East Pittsburg, Pa.

W. J. REARDON.

Mr. Reardon was born 39 years ago at Paterson, N. J., and upon finishing his education at the public schools, he entered the brass foundry of McNab & Harlin Company of that city, to learn the trade, starting at the bottom rung of the ladder. Upon mastering the art of brass casting at the McNab & Harlin works, Mr. Reardon's next foundry was the Cooke's Locomotive Works of Paterson. He then went to the Kelly & Jones Company of Jersey City, which afterwards moved to Greensburg, Pa. His next shop was the Kennedy Valve Company at Coxsackie, N. Y., which has since located in Elmira. For the last eight years Mr. Reardon has had charge of the Westinghouse Foundry, and it is at this plant, with all the equipment, encouragement and opportunity afforded that he has done his best work in directing the casting of the variety of shop work which necessarily comes up daily in a foundry of this size.

Mr. Reardon was so successful in getting sound copper castings that he was sent to England and France to teach the Westinghouse plants in those countries how to accomplish the art. Formerly in England and France they were only able to cast copper of 50 per cent. conductivity. After Mr. Reardon's instruction the castings showed a conductivity of 90 per cent.

Most of THE METAL INDUSTRY readers are more or less familiar with Mr. Reardon and his work, for he has been from time to time a valued contributor to these columns, being able to write readable articles and make sound castings—a rare combination.

President J. A. Rickettson, Jr., of the A. Garrison Foundry, Pittsburg, Pa., has been examining recently the history of roll making for the metal industry, and finds that the first chilled rolls were made by his company in 1843 for the Scovill Manufacturing Company, Waterbury, Conn. A representative of the Garrison Company during a trip to England found that the chilled rolls were being made in that country for the Scovill people, and he returned and secured the order for America, and the Garrison Company have been making since that time the Scovill rolls.

J. B. Wise, of Watertown, N. Y., is now on a Western trip, which will include Sitka, Alaska. Mr. Wise is a manufacturer of brass goods, and has recently bought the American rights of the M. R. V. furnace.

Pierce G. Smith, formerly sales manager of the Allyne Brass Foundry Company, of Cleveland, Ohio, has become manager of the metal melting department of the Rockwell Furnace Company of New York. Mr. Smith's connection with the brass foundry business enables him to handle the furnace end in a practical fashion.

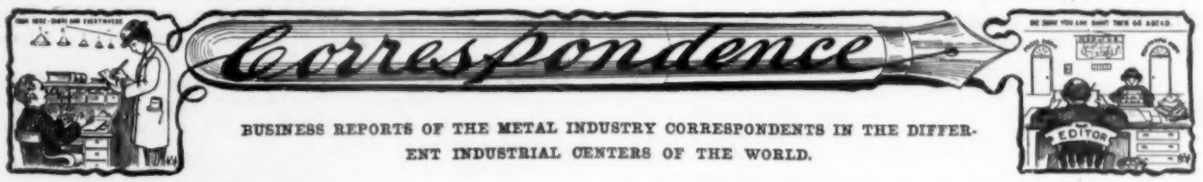
Cecil H. Wilson, director of The Sheffield Smelting Company, Limited, Sheffield, England, has been visiting the United States, business and pleasure being the objects of his trip.

Charles F. Brooker, of Ansonia, Conn., president of the American Brass Company, spent a few days in Washington recently, presumably in connection with tariff matters.

DEATHS

Charles E. Evans, treasurer of the Evans Stamping and Plating Company of Taunton, Mass., died at his home in Taunton, Mass., May 26, 1909. Mr. Evans was one of Taunton's most representative business men, and had practically worn himself out furthering the interests of the company of which he was treasurer. He was fifty years old and had made a warm place for himself in the hearts of his associates, by whom his loss will be keenly felt. He leaves a wife, a daughter and one brother.

Frederick Kato, president of the Kato Manufacturing Company, of 236 Baldwin avenue, Jersey City, N. J., makers of high-grade artistic bronzes, died on April 20 at his home in Jersey City. Mr. Kato was 43 years of age and was a prominent member of the New York Mineralogical Society, the New York Microscopical Society, Brooklyn Institute, Torrey Botany Club, The Writers' Club of Brooklyn, The Aqua Club and others.



BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS IN THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

JUNE 7, 1909.

Novelties, the everlasting demand for which has kept more than one factory pay-roll up in this valley during the past three years, are the products most in demand now and with the passing of midsummer the indications are that there will be enough work of this to keep many men overtime in many shops.

Another good sign is that the plans for development of several of the smaller industries are going forward. There will be a handsome new plant completed by the Novelty Manufacturing Company on the Watertown road, Waterbury, during the next four or five years, and the plans are so well along now that some of the preliminary work has already been done on the land secured some time ago for a site. Here is a concern which has had remarkably steady growth and has come out of the storm apparently with every spar firm. The company has gone into an extensive line of bathroom fixtures, in addition to its countless novelties, having recently landed a large New York contract. Its offshoot, the Crescent Manufacturing Company, seems to be well started. Recently a new product, a patented gas lamp, has been added to the catalog and has already begun to make such strides forward that some of the older patented lamps, which have long held a regal position, are threatened.

Of late there has been a noticeable decline in the activity of the New England Watch Company, and with this comes now a story that there is a possibility of consolidation with the Waterbury Clock Company. There are rumors, too, that the Illinois Watch Company has been negotiating for the purchase of its case-making business. All these rumors are as yet unofficial and to be considered only as shop talk, perhaps, but few of the manufacturing wiseacres will be surprised if an official statement is issued soon regarding the future of the New England Watch Company. Consolidation with the Waterbury Clock Company is the most likely solution.

Perhaps the most encouraging feature of the summer outlook here is the chorus of good cheer from the railroads. That they have been going forward during the past year has had a remarkably cheerful effect on the general outlook, regardless of copper worries and stock market dope. Tariff sins on the part of Congress have kept the people of all the manufacturing cities guessing, but the railroad reports, one after another, have helped nourish the smiles. Their prosperity means continued expansion, more or less far-reaching on its effect here. The increase in the use of brass in the equipment of railroads is remarkable according to statistics, and Waterbury has learned to appreciate the fact.

Freight has fallen off slightly during the past ten days, although heavy for the months of April and May, but the decrease has not been sufficient to cause any worry.—F. B. F.

BRIDGEPORT, CONN.

JUNE 7, 1909.

The greatest industrial event for Bridgeport, in some time, was the closing of negotiations between the local Board of Trade and the Whiting Manufacturing Company, by which this well-known firm of silversmiths will leave their factory on Fourth street, New York City, and move to Bridgeport. The contracts have already been awarded for the buildings. The change in location was brought about in this way: The company's lease being about to run out, one of the firm suggested Bridgeport. At once a letter was sent to the local Board of Trade, who made the company several offers. The final offer, which clinched the deal, was that of giving the Whiting Manufacturing Company land free for the factory if they would settle here. The members of the Board of Trade presented this land out of $10,000 subscribed from their own bank accounts. The Whiting Manufacturing Company plan to erect a building which will cover nearly an acre and one-half. Foundries, freight yards and coal sheds will cover the rest of the land, which totals to over five acres. Work has been started on foundations of the building. The company itself is one of the best and most stable of the kind in the country. It will employ over 600 hands, and with the enlargement of the plant, after becoming settled in Bridgeport, the number will be materially increased. The capitalization of the company is $1,200,000.

Following the announcement of the coming of the Whiting Manufacturing Company, the local newspapers said that the Board of Trade had three more concerns which they expected to bring to Bridgeport, one of them being a copper wire concern. They refused to make public the name of the concern but said it was to come from one of the cities in New York State.

The brass foundries in this city for the last three months have been on the jump. There are a number of these concerns which cater entirely to local trade. In the cases of these foundries, the amount of business depends entirely on the output of the various factories in Bridgeport which these small foundries supply. Many articles in this city need brass, copper and bronze trimmings, most of which are furnished by some local concern.

The owner of one of the independent brass foundries in this city, John Hamilton, made the following statement: "Conditions regarding local trade are, in my opinion, the best in several years. Our factory and foundry is running full time and full

handed. As we handle local work only and solicit no orders from out of the city, our work and profit is dependent on the general industries of Bridgeport. We can in a measure gauge the prosperity of the city by the amount of orders for our goods. At present many new houses are being built, and we have a great number of orders for plumbers' supplies. There is plenty of chance for good men in Bridgeport, and skilled labor is in great demand."

The foundry of the Bridgeport Brass Company is running full time and several nights the last month has run overtime. Their castings are in demand, and in order to fill the orders this is a necessity. The concern have ordered plans for a $50,000 building, but it is doubtful if work on it will be commenced much before next year.

When asked the other day about the metal output from this city other than that of iron, a railroad man said: "Freight from this city is nearly double that of this time last year, and a great deal larger than this time in 1906. There is a great deal of metal shipped out of here to the Western States. Only yesterday five carloads came in of scrap brass and copper, consigned to one of the local firms."

What should be more natural if the brass trade was on the boom in Bridgeport, mostly from local conditions, than that the small plating concerns should also be working to the limit. Such is the case and all of the ten or twelve plating establishments in town are working full blast. Edmund Warren, owner and manager of the Edmund Warren Electro-Plate Co., of this city, uses the growth of his own plant, now one of the largest in the city, as an example of the increase of this industry in Bridgeport. Two years ago he employed only eight men. Now he has over 25 on and is running overtime. The output of this concern has doubled that of 1906 already. "Of course, during the hard times in 1907 and 1908 the plant suffered some," said Mr. Warren, "But now I can see that business has come back twice as strong." This concern handles a great deal of the electroplating for the factories in Bridgeport not having their own plant. So great is the demand for plating that Mr. Warren is contemplating running every Saturday afternoon and possibly three evenings a week.

The Bridgeport Electro Plate Co., according to Harrold S. Brown, secretary and treasurer, is running very nearly to the limit and is turning out about six tons of plated ware each day.

Harrold Provost, press agent for the recent Slavonic Convention which was held here recently, said that the metal industries of Bridgeport employed 4,500 Slavonians. During the two days of the convention every superintendent and manager of the factories of the city allowed their Slav employees to be absent from duty.

Two weeks ago an alleged thief was trapped in the Locomobile Company of American plant and charged with the theft of $500 worth of platinum. He was arrested and bound over to the fall term of the Criminal Superior Court under $500 bonds which he paid out of a bank account. He has been stealing this platinum, it is alleged, for over three months. After accumulating several ounces he would send it to a metal broker in New York. He had checks amounting to $100 on his person when arrested and a letter from the broker in New York acknowledging the receipt of some of the platinum. He gave his name as L. J. Peirson and said he was unmarried.

Few concerns enjoy such rapid growth as the Bridgeport Metal Goods Manufacturing Company situated on Howard avenue in this city. A charter was granted to this firm on March 4 from the State of Connecticut. Within the three months the concern has developed into one of the rising manufacturers of brass goods in the city. H. K. Beach, secretary and treasurer, said: "We have received orders enough to carry us through the year and put us safe for the next season. We are not taxed to the limit and can take care of more work."

The work turned out by the factory is mostly done by power presses. Novelties, desk finishings and all sorts of brass fittings are stamped and punched out and shaped by thi concern and Mr. Beach has ordered 100,000 pounds of sheet and coil brass which they expect will last until late in the fall. The plant itself is light and roomy and is so situated that it can be greatly enlarged should the officers of the company see the need. It measures 325' x 50' and is two stories high. Twenty men are employed and perhaps a few more may be put on during the summer. The largest shipments go to Canada, and the Western States. The officers of the company are A. S. Lyhne, president; S. H. Harmon, vice-president; H. K. Beach, secretary and treasurer, Charles Phillips, superintendent. Capital $50,000.—L. E. B.

PROVIDENCE, R. I.

JUNE 7, 1909.

The approach of the summer season finds the usual dullness pervading the manufacturing jewelry trade in Providence and vicinity. Some of the factories are still running in lively fashion, but the market is slow in nearly all lines. Most of the establishments are planning to shut down for several weeks during July and August for the usual vacation period.

The manufacturing jewelers are predicting a heavy rush when the fall season begins. Reports from the field indicate that the factories wil be kept running at high speed when once the tide of orders sets in. The jewelers are delighted with the outlook.

The Rueckert Manufacturing Company has filed articles of incorporation with the Secretary of State. The incorporators are George C. Rueckert, Edward Rueckert and Arnold C. Brown. The new concern is capitalized at $30,000, and will manufacture jewelers' supplies.

Walter Schultz has filed a suit for $20,000 against the Gorham Manufacturing Company. The plaintiff claims that while he was polishing a metal door in October, 1908, the emery wheel burst and injured his head and face.

The Gorham Manufacturing Company recently completed the casting of a large bronze piece representing a soldier of the Civil War standing beneath the spreading wings of an angel of peace. The casting was for the Soldiers' and Sailors' Monument at Somerville, Mass.

The annual midsummer outing of the New England Manufacturing Jewelers' and Silversmiths' Association will take place Friday, June 18. The steamer "Warwick" has been chartered for the day. A parade will be held in Providence in the morning. The jewelers will then sail to Field's Point and enjoy a shore dinner. The "Warwick" will then carry the party to Newport, where a visit will be made to the Naval Station. Supper will be served on the steamer on the return trip up the Bay.

Four jewelry concerns located in the No. 1 Robinson building, Attleboro, were damaged to the extent of $15,000 by fire on the morning of June 7. The fire was caused by an explosion of acid fumes. The Smith & Richardson concern was damaged between $5,000 and $8,000. The other firms interested are Debra Brothers, the Winthrop Manufacturing Company and C. J. Morrison.

The E. R. Cook Jewelry Company has started a factory at 59 Page street, for the manufacture of gold front and plated jewelry.

Charles H. Ballou & Co., manufacturing jewelers, have removed from 157 Thurbers avenue to 129 Eddy street.

Theodore W. Foster & Bro. Co., manufacturing jewelers, recently held a three days' conference at their factory, 100 Richmond street, at which the members of the corporation and the salesmen considered all questions of interest to the firm. In addition to various business meetings, a number of outings added to the interest of the occasion. Theodore W. Foster, president of the company, was presented with a sterling silver loving cup.

C. A. Wilkinson, of the firm of C. A. Wilkinson & Co., manufacturing jewelers, was stricken with heart failure as he stepped from his automobile after a pleasure ride one day recently. Another recent death was that of Charles C. Carey, formerly of the jewelry firm of John T. Moran & Co., who suffered a stroke of apoplexy as he was watering his lawn.—E. S. U.

BUFFALO, N. Y.

JUNE 7, 1909.

There was a marked improvement noted in all our lines here last month and the metal trades in this vicinity may be said to be running along better and on a more substantial basis than in two years. Shops are busy and enough orders are already in hand to keep them operating up to present capacity, at least throughout June.

The brass foundries have lots of work and the outlook is bright for a good summer. The larger concerns find trade good. Some of the smaller shops that closed during the depression period

have not been reopened, but on the other hand those that did survive have made improvements.

The Lumen Bearing Company, manufacturers of machinery parts, is enjoying healthy business at its shops here and at the branch in Toronto, Ont., opened in 1904. The firm is building a brass foundry as a substantial addition to its main plant on the New York Central belt line that is 60 x 460 feet and will contain 35 furnaces, using crucibles from number 100 to 400, with a daily capacity of 30,000 lbs. This foundry will be in operation early this month and will give the firm 25,000 square feet of ground. The firm is manufacturing white metal castings with bronze dies. William H. Barr, treasurer and general manager of the company, says general business is good with them. "We are receiving many small orders from all parts of the country," he said. "This I believe is an indication that business is improving all around."

The Zero Valve & Brass Company reports the call for special brass work exceptional and that they are doing a fair trade within a radius of 100 miles of Buffalo. Most of their business is done for out-of-town firms.

Foundries say that considering the price of copper, which is down to 13½ cents, the lowest average price in about 30 years, business is good. They are now able to make better prices to the trade. After all the price of copper is an important factor.

The Lang Plating Company is keeping busy and reports all the work it can handle. Many of the small plating shops are doing a good house trade, while others say the work sent them from department stores is keeping them busy.

A. G. Fries, platers and brass finishers, are working up to their average capacity. They are doing lots of job work.

The Rayle Plating works and the Star Plating Works are running fairly busy. They had a good month in May and expect to do more from now on through the summer months.

The Liberty Brass Foundry Company was recently added to the Allyne Brass Foundry Company, at No. 1095 Niagara street, and its capacity has been considerably enlarged to care for the added trade. The Allyne Company makes most of the aluminum for two of the largest automobile concerns here.

The jewelry manufacturing in Buffalo is confined almost exclusively to rings. This is a big center in this line and one firm here does a business of about $1,000,000 a year. Few stickpins or fobs are made.

The plumbers' goods trade is still affected by a strike of plumbers in the city. This hits the supply men and they are not doing their usual business up to date.

The Bell Telephone Company has asked the police to be on the watch for wire thieves. The company had its Genesee street poles stripped of a mile of copper wire early in May.

For brass railing in the City and County Hall these two bids were received: J. H. Ruckel & Son, $410; Zero Valve & Brass Manufacturing Company, $417.

William F. Polson, an automobile dealer of this city, filed a voluntary bankruptcy petition last week. Liabilities $4,306.77, and assets $428.32. Among the creditors in the metal lines are: The Allyne Brass Foundry Company, $153.48; Phenix Manufacturing Company, $163.65; Theo. Hofeller & Julius Hofeller, $47.43; Williams Metal Stamp Company, $105.55; Arthur G. Fries, $25.31; Joseph and George C. Strauss, $113.11.

Police intercepted a wagon on the heel path of the Erie canal last week and found $500 worth of brass fittings in it stolen from the Tonawanda Board and Paper Company's plant. The driver was arrested but the other thieves escaped. The brass was stolen from the stock house of the plant.—F. M. A.

Buffalo, N. Y., June 7, 1909.

CLEVELAND, OHIO

JUNE 7, 1909.

One of the interesting developments of the past month has been the moving to Cleveland from Cincinnati of the headquarters of the National Metal Trades' Association, representing over 700 firms throughout the country who are engaged in the metal industry. Robert Wuest is commissioner in charge. He has a fine suite of offices on the sixth floor of the New England Building with an office force of six or seven. Cleveland was chosen because it is the geographical center of the metal industry of the country, according to Commissioner Wuest. Howard P. Eells, another Clevelander, is president of the organization. The association is seeking to reform the apprenticeship contracts and make them more uniform and is also greatly interested in industrial education along technical school and other lines whereby a better grade of apprentices can be turned out.

The plating industry in Cleveland is booming just now on account of the strong demand for automobiles. Nearly all the shops are hard at work, those in the auto factories particularly being rushed to capacity. There is also a good call for plumbing goods of all kinds, the building boom being at its height and Cleveland being a distinct leader in this regard.

Final order has been entered by the United States Supreme Court in the suit of the Joseph H. Glauber Brass Company against an Illinois firm as the result of which the Illinois people are enjoined from copying a Glauber patent. The suit arose over a doughnut-shaped metal washer half an inch across which, when inserted in a faucet, prevents "hammering." The suit has been in the courts for five years and over $40,000 in costs have piled up. The books of the Illinois company will be gone over according to court order and all profits accruing from the device will be turned over to the Glauber Company.

The Allyne Brass Foundry Company will erect a large new foundry at Carnegie avenue and East 61st street. It is to be a one-story structure of brick and steel 87 by 156 feet in size. The general contract has been let and the new factory will be ready for occupancy in the early Fall.

The International Spring Wheel Company of Cleveland has been incorporated under the laws of Ohio for $25,000. H. L. Olmstead is the chief incorporator.

A. J. Weatherhead, vice-president of the Cleveland Faucet Company, didn't yell when a pickpocket stole his purse with $150 in it while he was standing on the public square. Mr. Weatherhead gave chase and captured the thief and handed him over to the police. Weatherhead recovered his wallet from a waste paper box on the corner into which he saw the man throw it.

A Cleveland firm has offered to mend the cracked Liberty Bell. John Harris, who has a laboratory, has invented an oxygen acetylene flame which he had sold to the Braze-Weld Company, Academy street, this city. The flame, it is claimed, will weld the crack close in a very few minutes. It is so hot that it melts platinum almost instantly at 3,270 degrees, steel at 2,750, cast iron at 2,400 and copper at 2,300 degrees. The flame would be applied to the crack inside, melting and fusing the metal. The crevice would then be filled in with metal. The same company has offered to use the flame to cut away the mass of twisted steel girders in the wrecked bridge over the St. Lawrence River at Quebec which collapsed some months ago. This mass, weighing thousands of tons, still hangs from the bridge abuttments. A recent test made of the flame was when it was used to mend the arm of the Brown hoist radial drill, the largest in the world. The arm is a bar of steel seven feet six inches long. The break was mended in five hours so that it is now as strong as before and it is only 3/128 of an inch out of true.—S. Mc.

Cleveland, Ohio, June 7, 1909.

DETROIT, MICH.

JUNE 7, 1909.

Detroit is unquestionably the largest brass center in the United States and judging from present indications these conditions will continue to exist for all time. The automobile manufacture has given a great boom to this branch of metal industry and as the building of cars here is constantly on the increase the output in the brass line seems to have no limit.

Nearly every automobile establishment in Detroit has connected with it a brass foundry. There are a score or more of auto factories, big and little, here and from this a general idea of the magnitude of the brass industry can be gained. Added to these plants there is the great Burroghs Adding Machine Company that employs several thousand persons. This firm uses great quantities of manufactured brass and maintains in connection with the factory an up-to-date foundry.

John J. Whirl, secretary of the Manufacturers' Association, declares that nearly every brass establishment in Detroit during the past ten months has added largely to its plant. This is necessitated by the great demand for all lines of manufactured brass

goods, with a few exceptions such as those required in large buildings, and this line will improve during the next few months.

Mr. Whirl estimates that the yearly output of brass in Detroit is somewhere about twenty thousand tons. Much of this goes into the automobile industry and machinery supplies. Among the leading concerns which have added largely to their plants during the past few months are the Brisco Manufacturing Company and the McCord Company. The latter concern only located in Detroit a short time ago. It came here from Chicago and has found the move a most successful undertaking. The American Injector Company and also the Detroit Brass Works have increased their plants and report a steady growth in business. They are all manufacturing superior articles that are eagerly sought by automobile companies and machinists' supply houses all over the country.

Mr. E. J. Woodison, president of the Brass Founders' Supplies Company, located at Ferry avenue and Dequinder street, reports a remarkable revival of business in all lines of the brass industry. He reports sales heavy for tripoli, crocus, white finish and emory. He declares the business is steadily increasing and that the future could not be brighter.

Mr. William Corse, assistant manager of the Michigan Smelting and Refining Works, says the sales of red ingot brass is remarkably heavy. The demand in the city has been unusually vigorous during the winter and summer. But the same conditions exist outside as well.

The Ford Automobile Company, which probably uses more brass than any other establishment of the kind, has recently completed the largest automobile factory in the world. It covers several city blocks, is almost entirely of glass and modern in every respect. Besides this the company has just paid one million and a half dollars in dividends. Every one of their machines is loaded with brass trimmings and fixtures and all this work is done here in Detroit.

The plating industry is also experiencing a boom. Many large concerns have found it necessary to add this equipment to their plants. As a consequence employment is given to a large number of persons.

The manufacturing jewelers report a successful business during the past month. They are still pushing their trade to cover the large western field that was formerly held exclusively by eastern houses.—F. J. H.

Detroit, Mich., June 7, 1909.

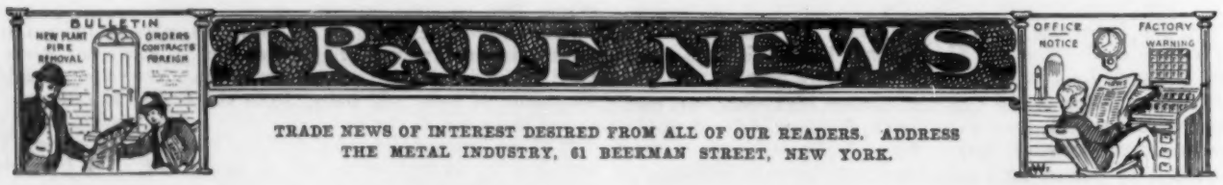
BIRMINGHAM, ENGLAND

JUNE 1, 1909.

The recent prosecution of a Birmingham jeweler for selling inferior quality of gold as 9-carat hall marked is the beginning of a campaign to be jointly carried on by the Birmingham Jewelers' Association and the Assay Office. A notice is at present appearing in the Birmingham newspapers to the following effect: "Birmingham Assay Office, to Jewelers, ring makers and others, notice is hereby given that it is an offense against the Assay laws to load or strengthen with solder rings or other gold or silver wares or to make any other additions thereto after they have been assayed and marked without first submitting such additions to the Assay Office. The penalty for offenses against this rule is £10 per article. The Assay Office on various occasions and quite recently have enforced payment of such penalities to large amounts, and will deal with the utmost severity with all similar offenses brought before them."

On behalf of the Assay Office it was pointed out by the Assay Master, Alfred Westwood, in the course of an interview that this is a fraud which the public are almost powerless to protect themselves against, which arises out of the keenness of competition in the cheaper kinds of gold and silver jewelry. The practice is often to manufacture rings hollow, which receive the hall-mark, not as rings, but upon the outer and inner strips of gold of which they are built up. An unprincipled manufacturer can beat these strips out to greater length and then when one of them is rounded to form the outer surface of the ring, solder is run into it, adding to its strength, and also to its weight. The purchaser only finds the imposture when some portion of the ring wears through, and reveals the white metal inside, or in the event of its having to be cut to alter its size. The effect of manipulation is that whereas a ring may be marked 9-carat, yet if it were melted down the assay would show perhaps only 4 or 5-carat. It is notorious that such frauds are somewhat numerous, but until the recent prosecutions neither the Assay Office nor the Jewelers' Association could secure sufficient evidence to obtain a conviction. The association is appealing to honest jewelers to join their body and assist in defeating this kind of fraud.

Many jewelry manufacturers are complaining about German competition, and are clamoring for an import duty.—J. H.



TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The Wolverine Brass Company, of Grand Rapids, Mich., recently shipped a large order of ball joint fittings to Austria.

Geo. T. Byers, 69 John street, New York, manufacturer of gold and silver chased work, has recently put in a plant for silver deposit work on fountain pens, etc.

Fred Grimes, of 5116 West Thompson street, West Philadelphia, Pa., has taken the agency of The Metal Dross Economy Co.'s skimming tank for the State of Pennsylvania.

The Buffalo Tube Company, Buffalo, N. Y., is running until 10 p. m. every night, in order to fill orders for small sized brass and copper tubing which is used principally in automobile work.

The Work Casting Company, 1417 Niagara street, Buffalo, N. Y., report that business has been very good since they were established a year ago. E. G. Northrop is the manager of the plant.

Alfred Fisher, Chicago, has just secured the order for twelve of his brass melting furnaces for the L. Wolff Manufacturing Company, Chicago. This is a fine order, and was secured against strong competition.

John J. Harman, mechanical engineer, has become a member of the Harman Engineering Company, Peoria, Ill. This firm makes a specialty of mechanical engineering problems and the investigation of manufacturing processes.

C. W. Marwedel, 76-80 First street, San Francisco, Cal., has sent out attractive picture postal cards showing his new building into which he has moved. His facilities for furnishing tools, metals and shop supplies are better than ever.

Frederic B. Stevens, Detroit, Mich., has just bought a three-story brick building, having a frontage of 150 feet on Larned street, which has been equipped with machinery, giving him additional facilities for the manufacture of his buffing compositions and platers' supplies.

The Farrel Foundry & Machine Company, Ansonia, Conn., announce the opening, on June 1, of a branch office at 1011 Williamson Building, Cleveland, O. Correspondence addressed to the Cleveland office will receive prompt attention from George W. Osborn, who is in charge.

The Duplex Metal Company's works at Chester, Pa., which have been practically shut down for several weeks, opened up on

May 10 in full force. It is reported that the company has received a number of large contracts and that the mill will be operated to its full capacity for some time to come.

The Hanna Engineering Company, Chicago, and the Rathbone Molding Machine Company, Detroit, have joined forces under the name of the former company. The Hanna Company makes a large line of foundry supplies and the Rathbone Company has for some years been making the Rathbone molding machine.

The Detroit Die Sinking Company, of Detroit, Mich., have just closed up their first year's business and announce that it has been extremely satisfactory, especially in view of the dull times prevailing during this period. W. B. Speirs, of this company, reports that during the past month business has improved very noticeably.

The W. W. Oliver Machinery Company, Buffalo, N. Y., are exporting their rolls to Sweden, Switzerland, Australia, Russia and other foreign countries. The rolls are particularly suitable for manufacturing jewelers, silversmiths and all other classes of metal works needing small rolls. Catalogue "D-16" describes them fully, and is sent on request.

The Hartman Aluminum Solder Company, 426 West 52d street, New York City, are receiving some very flattering testimonials bearing on the excellence of their work. The Hartman Company are now doing repair work on aluminum castings for some of the largest automobile companies, and their solder up to date has stood the most severe tests put upon it.

The Hoyt Electrical Instrument Works, of Penacock, N. H., announce that on account of their rapidly increasing business they have found it necessary to secure more office space in New York City, and have, therefore, moved their office from 1931 Broadway to 136 Liberty street, where they are in a better position than ever to give all business entrusted to them the best possible attention.

A new move has been made by the Detroit Foundry Supply Company, of Detroit, Mich., who have purchased the business of the Detroit Platers and Polishers' Supply Company, manufacturers of tripoli, crocus, vienna lime, etc., and dealers in all kinds of platers' and polishers' supplies. The acquisition of this business puts the Detroit Foundry Supply Company in a position to meet the requirements of platers and polishers as well as founders.

General Manager Jeremiah Howe hopes to have the addition to the Buffalo Copper and Brass Rolling Mill in operation by August 1. The present building of the rolling mill is 360 feet long and the extension will be 144 feet, giving the new mill a length of 504 feet, with a width of 176 feet. The plant is built so that it can be extended at any time, the company owning plenty of land for extensions. The mill is situated on the New York Central Railroad.

Rumors were prevalent early in May to the effect that the casters at the Waterbury Brass Company, Waterbury, Conn., were about to strike, having become dissatisfied at being required to make five rounds a day instead of four rounds, which they thought sufficient. Officers of the company, however, denied that any serious dissatisfaction had been manifested and stated that all the men were at work and it was expected that they would continue at work indefinitely.

E. Sachs & Company, Warren street, Valley, Brisbane, Australia, proprietors of the Queensland Galvanizing Works and manufacturers of sheet metal ware, etc., advise us that they contemplate installing a plant for sheradizing, and desire to correspond with manufacturers of equipment suitable for a plant with a capacity of one or two tons of small articles a week. They also are in the market for zinc dust, an article which is difficult to procure in Australia, and which they intend to import.

S. H. Brand & Company, of Chicago, Ill., are calling the attention of foundrymen to their complete line of foundry supplies and to several specialties, among which are galvanized riddles equipped with Brand's metallic clip, which adds materially to the strength and durability of the rims, preventing them from ripping or tearing away. Another specialty is Brand's patent bellows, which are especially designed for the best class of work. They state that their line of standard supplies includes everything needed by the up-to-date foundryman.

The Benedict Manufacturing Company, East Syracuse, N. Y., recently called in all their traveling representatives for the purpose of getting out their fall samples of silverware and metal goods, and took advantage of the occasion to entertain them at an outing at South Bay, Oneida Lake. The day was spent in fishing, boating and having a general good time. Among those present was H. L. Benedict, president; C. C. Graham, sales manager; R. B. Roantree, treasurer; W. M. Upright, advertising manager; A. F. Saunders, designer; Edwin Dorner, manager of the New York office, and the following representatives: John Bailey, who covers Pennsylvania and Virginia; J. F. Kane, New York and New Jersey; J. P. Deal, Atlantic Coast States; W. A. Patten, Ohio and Indiana; H. S. Osmun, Michigan; F. J. Reynolds, Middle Southern States; F. A. Wetherley, Illinois, Iowa and Nebraska; Newton Owen, special representative; A. I. Patton, Kansas, Oklahoma and Indian Territory; J. H. Webster, Wisconsin, Minnesota, North Dakota and South Dakota; M. H. Jackson, Pacific Coast and Honolulu; L. G. Proctor and J. H. R. Proctor, Dominion of Canada.

EQUIPMENT OF THE METAL SHIP.

The ironless vessel, the "Carnegie," described in the January, 1909, issue of THE METAL INDUSTRY, was launched June 12 and by the middle of July will be ready for sea. A variety of firms furnished the various metal parts. The Johns-Manville Company, of Brooklyn, N. Y., furnished the brass castings for the spar hardware; the U. T. Hungerford Brass and Copper Company, New York City, the composition fastenings, including the bolts, spikes, etc., and the Ansonia Brass and Copper Company, New York City, the tobin bronze bars used in the different stays, the steering gear, etc.; the Baldt Anchor Company, of Chester, Pa., furnished the various bronze anchors weighing 1,900, 1,300 and 340 pounds. The American Ship Windlass Company, Providence, R. I., built the bronze wenches, also the main sheet capstan. The brass deck plates and sidelights were furnished by C. D. Durkee & Co., New York City. The four-cylinder 200-horsepower bronze engine, the bronze crank shaft and bronze reversing gear was built by James Craig, 34th street, New York. The Remington Engine Company, of Stamford, Conn., furnished a bronze kerosene engine for operating the refrigerating plant and ventilating system. Other copper work was furnished by the Railway and Equipment Company and the A. B. Sands & Co., of New York City. The bronze blocks were built by McMillan & Sons and the tobin bronze wire rigging was manufactured by the Waterbury Brass Goods Corporation, Waterbury, Conn.

ELECTIONS

At the annual meeting of the International Nickel Company held in New York recently, the vacancy on the board of directors caused by the death of Joseph Wharton, of Philadelphia, Pa., was filled by the election of Admiral W. H. Bronson to the directorship.

REMOVALS

The Doehler Die-Casting Company, of Brooklyn, N. Y., have moved their factory from Park avenue to 187 West 9th street, between Smith and Court streets. This gives them threefold their former capacity and puts them in a position to fill all orders for die-castings very promptly.

FIRES

The plant of the Dundee Brass Manufacturing Company, of Dundee, N. Y., was entirely destroyed by fire on the night of May 15. Press reports state that the loss of plant and contents

amounts to $30,000. Insurance to the extent of $12,000 was carried. At a special meeting of the stockholders a few days later, at which twenty out of the twenty-three holders of stock in the company were present, it was unanimously voted to rebuild at once. A building committee was appointed consisting of J. M. Ovenshire, John W. Norris and Charles Watson.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Correspondence" columns.

THE IMPERIAL BRASS COMPANY, Detroit, Mich., have filed articles of incorporation. Capital $10,000.

THE MINNESOTA BRASS WORKS COMPANY, Duluth, Minn., have been incorporated to manufacture brass, bearing metal, babbitt metal, etc. S. T. Rery is president and J. I. Foster, manager. The works are located at 2110 West Michigan street, where equipment is now being installed.

THE STANDARD BRASS & COPPER TUBE COMPANY of New London, Conn., has been incorporated in Connecticut; capital $50,000, of which $6,250 is reported paid in. The incorporators are Wm. M. Parke and Roger J. Heisler, of New York, and Frederick J. Loomis, of New London, Conn.

GENERAL VANADIUM COMPANY, of America, Greensburg, Pa., have filed articles of incorporation in Delaware; capital $50,000. Incorporators: Clarke McColley, Greensburg, Pa.; Wm. P. Dee, Baltimore, Md.; John Burlinson, New York; S. H. Wright, Washington, D. C. The object of the company is to produce, manufacture and sell vanadium and vanadiferous ores and metals.

SOUTHERN IRON AND STEEL COMPANY, Jersey City, N. J.; capital, $17,000,000. To manufacture iron, steel, manganese, coke, copper, lead, zinc, nickel, etc. Incorporators: Daniel S. Boisserain, 135 Madison avenue, New York city; Carl M. Owen, 600 West 146th street, New York city; William R. Sainsbury, Fifteenth street and Benson avenue, Bath Beach; William B. Denton, 206 West Ninety-ninth street, New York city, and Kenneth K. McLaren, 115 Arlington avenue, Jersey City.

A company, having a capitalization of $500,000, has been organized to revive the mining of nickel, which was once so important an industry in Bart township, near Lancaster, Pa. Years ago the nickel mines of that section were known the world over, but in recent years the industry was neglected, owing to lack of interest. Now that new deposits of the metal have been found, the matter has been brought to the surface and the mining will be carried on a large scale. The directors of the new mining company are: Harry C. Howell, Philadelphia; John Hocking, West Grove; Theodore W. Stauffer, Philadelphia; George H. B. Martin, Camden, N. J.; Jonathan Jessop, York; Charles W. Neeld and Edgar A. Gillinder, Philadelphia. The mines were first developed by the late Joseph Wharton, of Philadelphia.

REORGANIZATIONS

J. M. Ney & Company, manufacturers of silver solder and precious metals for dental use, has been reorganized under the name of The J. M. Ney Company, Hartford, Conn.

The business of the Whitney Electrical Instrument Company, Penacook, N. H., has been taken over by the Roller-Smith Company, Bethlehem, Pa., and the Whitney Company has gone into liquidation. Part of the Whitney Company's employees are now employed at Bethlehem and a part with the Hoyt Electrical Instrument Company at Penacook.

BUSINESS TROUBLES

The firm of Batcheller, Clark & Batcheller, manufacturers of metal working machinery, located at 90 West street, New York City, have made a general assignment to Horace D. Byrnes, 309 Broadway, New York, who reports that he will use his best efforts to make the loss of the creditors as small as possible. Mr. Byrnes reports that the amount of the company's indebtedness is not very great, and that the claims are generally small.

James Berry and Drury W. Cooper have been appointed receivers of the Western Foundry Supply Company of New York City, with headquarters at 50 Church street. The receivers report that the company had overstocked, anticipating a more active market for their materials, and that the business will be continued the same as heretofore, and that probably all creditors will be paid 100 cents on the dollar, as the assets appear to be far greater than the liabilities. The company is only temporarily embarrassed through the lack of ready cash.

PRINTED MATTER

THE DECK GRAVITY LEVEL, manufactured by the Risdon Tool Works, Inc., 63 Canal street, Waterbury, Conn., is described and illustrated in a 4-page folder.

ANTIMONY AND ITS RELATION TO BABBITT, ANTI-FRICTION AND OTHER METALS is described in a small folder issued by C. W. Leavitt & Company, St. Paul Building, New York City.

INDEX CARDS, specially ruled and printed in reference to the convenient compiling of data regarding quotations of brass, copper, bronze, etc., are issued by Arthur T. Rutter & Company, 256 Broadway, New York City.

ALLOY.—The International Metal Sales Company, American Trust Building, Cleveland, Ohio, are issuing a four-leaf pamphlet entitled "Napoleon" Manganese Bronze Alloy for producing manganese bronze. The alloy is sold in ingots.

MCKESSON & ROBBINS, manufacturing chemists, New York, issue at frequent intervals a manufacturing list of chemicals, metals, etc., made and handled by them. It is useful to electroplaters and brass founders as a guide to current prices.

GRAPHITE. A bright and interesting publication of the Joseph Dixon Crucible Company, Jersey City, N. J., has been issued for June. Like previous numbers of this journal, it is full of valuable information regarding the various graphite products made by this concern.

THREE POUNDS FOR THE PRICE OF ONE is the style of a brochure sent out by the Buckeye Manufacturing Company, Cincinnati, Ohio. This bright little booklet is full of startling claims for Buckeye Parting Compound which the manufacturers say can only be proven by using the material.

RELIANCE PLATING AND TUMBLING BARRELS, made by Chas. F. L'Hommedieu & Sons Company, Chicago, Ill., are described in a pamphlet recently issued. The special features of these barrels are brought out, and the principal dimensions, floor space required, etc., are given in plain figures.

FIRE BRICK.—Frederic B. Stevens, Detroit, Mich., has issued a 25-page booklet showing cuts of the various shapes of fire brick, in colors, together with descriptive matter concerning the use of this material. Any one who is interested in using or selling fire brick can obtain a copy by writing to Mr. Stevens.

TECHNO N. F. ALLOY (non-ferrous), a new flux for use in brass, bronze and gun metal, is being put out by the Techno Chemical Company of Cleveland, Ohio. This company also make Techno F. Alloy (ferrous) for iron and steel welding compounds, case-hardening compounds, c. p. acids and ammonia.

"MASCOT" TRIPOLI COMPOSITIONS. Are high finish or particular products of the Bennett-O'Connell-Stevens Company, 94-96 S. Clinton street, Chicago, Ill. These articles are particularly

adapted for cutting down and polishing articles of brass and aluminum preparatory to plating. This company also manufactures crocus, emery cake, emery paste and rouge.

KITCHEN UTENSILS AND SPECIALTIES OF ALUMINUM. Are manufactured by the Buckeye Aluminum Company of Doylestown, Ohio, who have just issued a 32-page catalogue profusely illustrated with cuts of their products. All of the articles manufactured by this concern are spun from pure aluminum, except the handles, which are cast. The catalogue will be sent upon request.

THE LIGHT MANUFACTURING AND FOUNDRY COMPANY, of Pottstown, Pa., are distributing a card demonstrating the uses for which their automobile brand of aluminum castings are adapted. They show pictures of some of the more difficult classes of automobile castings which they have successfully produced. These include gear coverings, crank cases and castings of bearings for high-speed machinery.

THE BRISTOL COMPANY of Waterbury, Conn., have issued bulletins 99 and 102. The first mentioned describes the combination indicating and recording unit of Wm. H. Bristol's electric pyrometers. Bulletin 102 consists of advance partial lists of Bristol's recording pressure and vacuum gauges. This bulletin has been followed by a more exhaustive catalogue, Bulletin 103, of Bristol gauges, which will be sent free on request.

PRIVATE TELEGRAPHIC CODE BOOK. Theodore Hofeller & Company, Buffalo, N. Y., the well-known dealers in metals, old rubber and other waste materials, are sending to each of their customers a copy of their private telegraphic code book. This book is very complete in all details, and is attractively bound in flexible leather covers. Those of the firm's customers who have not yet received a copy should write at once for this useful publication.

WATCHMAKERS' AND JEWELERS' TOOLS. Kendrick & Davis, Lebanon, New Hampshire, have sent us their Book of Tools, No. 6, and their Book of Electrical Goods, No. 9, which are convenient reference books of the goods which they manufacture for watchmakers' and jewelers' use. This old-established house is continually bringing out new things in these lines, and offers to send printed matter describing them from time to time to those interested.

CLEVELAND INDUSTRIAL EXPOSITION is the subject of a small pamphlet issued by the Cleveland Chamber of Commerce of Cleveland, O. This Convention will take place in Cleveland, Ohio, June 7 to 19, 1909, and promises to be an enormous success. The list of exhibitors up to date include practically all of the concerns of the city. Further information may be had by addressing Wm. G. Rose, secretary, Cleveland Industrial Exposition, The Cleveland Chamber of Commerce, Cleveland, Ohio.

CRUCIBLE RINGS. The Waterbury Crucible Company, of Waterbury, Conn., have issued a catalogue describing their crucible ring, which they say is a simple contrivance for creating perfect combustion and securing a saving of fuel in the melting of all metals. This ring or disc is placed on top of the crucible and extends outward to within a short distance of the sides of the furnace. This projection of the ring over the edge of the crucible stays the rush of heat and is said to cause all gases to be entirely consumed before entering the flues. The catalogue gives other particulars regarding these rings which should be of interest to every foundryman who uses crucibles.

MELTING AND OTHER FURNACES. Catalogue No. 4, treating of furnaces made by the W. S. Rockwell Company, Hudson Terminal Building, 50 Church street, New York, deals particularly with metal melting furnaces, and contains illustrations of the latest W. S. Rockwell design—the Rockwell double-chamber tilting crucible furnace—which differs from former designs in having two combustion chambers—one each side of the crucible, each equipped with a separate burner. This design insures uniform distribution of the heat all around the crucible, and is claimed by the manufacturers to have demonstrated remarkable efficiency as a rapid and economical melter of metals having a high melting point.

PLATERS' AND POLISHERS' SUPPLIES. The Dow Chemical Manufacturing Company, Mansfield, Ohio, are distributing their new catalogue, which contains illustrations and descriptions of most of their complete line of supplies and equipment. The 145 pages, of which it consists, presents much useful information to platers and polishers. The catalogue is very handsomely finished with excellent half-tones and printed on heavy glazed paper. The descriptions of dynamos, polishing and grinding lathes, plating tanks and sand blasts, etc., are particularly clear and concise. The book contains also the list of chemical, commercial and common names of substances used in dipping, plating and coloring of metals as compiled by Chas. H. Proctor and published in THE METAL INDUSTRY—January, 1908.

ADNEWS

The Ideal Furnace Company, Chester, Pa., solicit inquiries from all foundrymen who desire particulars of their new coal or coke-fired tilting crucible furnace.

The Sangamo Electric Company, Springfield, Illinois, advertise their ampere-hour meter for platers—a device that controls the amount of metal deposited in plating operations.

The Buckeye Products Company, Cincinnati, Ohio, announce that Buckeye partings are extensively used by United States navy yards and arsenals, and invite requests for working samples.

The Globe Plating Company, Mansfield, Ohio, announces their readiness to undertake electro or hot galvanizing, gold, silver, nickel, copper and brass plating, oxidizing, polishing, enameling and japanning.

The Levett Manufacturing Company, Matawan, N. J., advertise the best quality of electroplaters' and polishers' equipment and supplies at lowest prices. They invite correspondence from interested persons.

O. J. Mousette Company, Incorporated, Brooklyn, N. Y., announce that they have recently made improvements in the Monarch crusher and pulverizer, which greatly increases its efficiency without increasing the horse power required to operate it.

On another page of this issue appears the card of George C. Davis, analytical and consulting chemist, 39 South Tenth street, Philadelphia, Pa., whose services may be secured by those desiring analyses of alloys, iron, coal, sand, clay, cement, ores, etc.

The Globe Machine & Stamping Company, Cleveland, Ohio, invite correspondence from concerns requiring galvanizing done by contract with a view to substituting the new sherardizing process for the older methods. They also furnish complete sherardizing plants.

Thomas W. Pangborn Company, New York, who are well known as engineers and as manufacturers and dealers in all kinds of foundry and machine shop supplies and equipment, call attention to several of their equipment specialties listed on the front cover of this issue.

The Potters' Kiln & Tool Works, Chicago, Illinois, are offering to founders the Kuehl patent natural draft oil burning melting furnace, which requires no blower or air compressor, and which, they state, will melt any metal up to 3,200 degrees Fahrenheit, completely consuming all of the oil and producing no smoke.

The firm of John Hassall, Inc., 188 Lafayette street, New York, announces on another page that the extensive and up-to-date facilities of their plating department are offered to those in the trade who desire brass, copper, nickel and silver plating, tinning, etc., done at reasonable rates. On small articles in large quantities they can quote from one to five cents per pound. Hassall's rivets and escutcheon pins have been favorably known to the trade since 1850.

COPPER PRODUCTION

(Issued by the Copper Producers' Association.)

	June 10, 1909. Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States, May 1	183,198,073
Production of marketable copper in the United States, from all domestic and foreign sources during May.	118,356,146
Deliveries of marketable copper for consumption and export during May	131,706,078
Stock of marketable copper of all kinds on hand at all points in the United States, June 1	169,848,141

METAL MARKET REVIEW

NEW YORK, April 11, 1909.

COPPER.—Standard Copper in London has been active and higher, and, helped along by the advances in the American market prices to-day, are about £3 per ton higher than a month ago.

The New York market has been firmer, and prices have been forced steadily upward, with a reported good demand from abroad, and also from home consumers. The wire drawers are busy, and some of them are running to full capacity, but the sheet makers are complaining of lack of orders, and some plants are partly closed. The demand from the brass mills is good, but the demand from this source is hardly sufficient to push the price of copper ½ cent per pound. The export demand has been good, and the powerful interests now in control of the Copper market are able to manipulate the Copper market to suit their operations in Wall street, and that's about all there is to the manipulated advance in Copper.

The exports continue on a large scale. For the month of May, inclusive of Southern and Pacific ports, the exports amount to 31,423 tons, making total exports since January 113,656 tons, against 133,872 tons during the same period in 1908.

The break of £1 per ton in the London price of standard copper at the beginning of June was said to be due to the big increase in the stocks of copper abroad, according to the European statistics of copper as published on the 15th and 31st of each month. According to these statistics the visible supply of copper abroad, stocks and copper afloat, increased 5,400 tons for the fortnight ending May 31, but in face of this bad showing abroad, the copper prices here were raised ⅛ cent per pound, and the London speculative market was higher to-day, June 3, in consequence.

The market to-day is firm, with lake at 13¾ cents, electrolytic 13½, casting, 13.40.

TIN.—The London tin market has been rather more active; prices advanced £3 per ton over the opening price, but the advance did not hold, and at the close prices were about £1 higher than a month ago.

In the New York market prices have followed the lead of London; in fact, the New York market has become solely an adjunct of the London Exchange; there are no independent operators here, all the sellers of pig tin in this market to-day take their orders from London, and the American is dragged about by the nose or the beak to the tune of the London speculative pipers.

The deliveries for the month were heavy, amounting to 3,900 tons, showing a net increase of 2,850 tons, compared with the same time last year. This 3,900 tons may not all have gone into consumption; there is still that 4 cent a pound duty in sight, and it is more than probable that consumers are loading up in anticipation of this increase. The total visible supply of tin has increased nearly 1,000 tons during the month.

The prices ruling to-day are for 5 to 10 ton lots, spot, 29.50 cents; small lots about 15 to 20 points higher.

LEAD.—The foreign lead market has held steady at around £13 per ton.

The home market has held firm, and with the Senate apparently unwilling to reduce the duty, the Trust will be able to run the lead market for their own personal gains and against the interest of any amount of consumers. Consumers are unanimous in calling the action of the Senate an outrage, but they do not get together to make a strong combined fight for right and justice, whereas the producers are a unit, and will probably carry the day.

The market is strong at 4.35 to 4.45 for carload lots New York.

SPELTER.—The foreign spelter market has advanced about 5s. per ton during the month.

The New York market has been strong, and prices have advanced about 35 points, closing at 5.45, New York, for carload lots. At St. Louis the market is firm at 5.30.

ANTIMONY.—There has been hardly any change abroad. Hallett's to-day, £31; other brands, £30.

Prices in the New York market are about the same as a month ago. Cookson's, 8¼; Hallett's, 7¾.

SILVER.—The London silver price is about the same as a month ago, opening at 24⅜, advancing to 24⅞, and closing at 24⅜d., against 24s. 7-16d. a month ago.

In the New York market prices show a net advance for the month of about ¼ cent, opening at 52¾c. and closing at 53c.

QUICKSILVER.—There has been no change in the price of quicksilver, $44.00 to $44.50 for wholesale lots, and $45.00 to $46.50 for jobbing lots per flask.

PLATINUM.—Prices are unchanged, $22.50 to $23.00 for ordinary; $24.50 to $25.50 for hard.

SHEET METAL.—The base price of sheet copper is 17 cents; copper wire, 14.50, and sheet brass, 14 cents base, with rods and wire 14¼c. base.

OLD METALS.—The old metal market has been rather more active, and prices show a slight advance for the month, particularly in copper and brass scrap. Lead scrap is firmer, owing to the stronger market. There has been no disposition to trade, but the demand is not anything like normal times.

THE MAY MOVEMENTS IN METALS

COPPER.	Highest.	Lowest.	Average.
Lake	13.50	13.00	13.30
Electrolytic	13.25	12.70	13.00
Casting	13.20	12.60	12.85
TIN	28.85	29.60	29.20
LEAD	4.40	4.20	4.30
SPELTER	5.25	5.00	5.10
ANTIMONY (Hallett's)	7.75	7.75	7.75
SILVER	.53⅞	.52⅜	52.90

WATERBURY AVERAGE

The average price of lake copper per pound as determined monthly at Waterbury, Conn.

1909. Jan. 14⅜ Feb. 13¼ Mar. 12⅞ April 13 May 13¼

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the report alone is $10. Sample copies furnished for the asking. We can furnish daily telegraphic reports of metal prices. Address THE METAL INDUSTRY, 61 Beekman street, New York.

INFORMATION BUREAU

Any firm intending to buy metals, machinery or supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Commercial questions are answered by return mail. Our Information Bureau is for the purpose of answering questions of all kinds. Address THE METAL INDUSTRY, 61 Beekman street, New York.

Trade Wants on Advertising Pages 40 to 43 Following

Metal Prices, June 11, 1909.

NEW METALS.

	Price per lb. Cents.
COPPER—PIG, BAR AND INGOT AND OLD COPPER. Duty Free, Manufactured 2½c. per lb.	
Lake, car load lots	13.75
Electrolytic, car load lots	13.50
Casting, car load lots	13.40
TIN—Duty Free.	
Straits of Malacca, car load lots	29.50
LEAD—Duty Pigs, Bars and Old, 2½c. per lb.; pipe and sheets, 2½c. per lb.	
Pig lead, car load lots	4.40
SPELTER—Duty 1½c. per lb.	
Western, car load lots	5.45
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods, 13c. per lb.	
Small lots	28.00
100 lb. lots	25.00
Ton lots	24.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's cask lots, nominal	8.25
Hallett's, cask lots	7.75
Other cask lots	7.60
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE METAL—Duty 20%	.80
MAGNESIUM METAL—Duty free	$1.30
BISMUTH—Duty free	1.80
CADMIUM—Duty free	1.00
	Price per oz.
GOLD—Duty free	$20.67
SILVER—Duty free	.52¾
PLATINUM—Duty free	22.75
QUICKSILVER—Duty 7c. per lb. Price per pound	62c. to 63c.

OLD METALS.

Dealers' Buying prices. Cents per lb.		Dealers' Selling prices. Cents per lb.
11.50 to 12.25	Heavy Cut Copper	12.50 to 13.00
11.25 to 11.75	Copper Wire	12.25 to 12.75
10.00 to 10.50	Light Copper	11.00 to 11.25
11.25 to 11.75	Heavy Mach. Comp.	12.00 to 12.50
8.00 to 8.50	Heavy Brass	9.00 to 9.25
6.00 to 6.50	Light Brass	7.00 to 7.25
7.50 to 8.00	No. 1 Yellow Brass Turnings	8.25 to 8.50
8.50 to 9.00	No. 1 Comp. Turnings	9.50 to 10.00
4.00 to 4.20	Heavy Lead	4.25 to 4.30
3.50 to 3.62½	Zinc Scrap	3.62½ to 3.87½
5.50 to 6.00	Scrap Aluminum, turnings	6.50 to 7.00
10.00 to 12.00	Scrap Aluminum, cast, alloyed	11.00 to 13.00
14.00 to 15.00	Scrap Aluminum, sheet (new)	16.00 to 18.00
19.00 to 23.00	Old Nickel, solid	20.00 to 25.00
19.00 to 20.00	No. 1 Pewter	20.00 to 21.00

INGOT METALS.

	Price per lb. Cents.
Silicon Copper 10% to 20%....according to quantity	28 to 30
Silicon Copper, 30%, guaranteed " "	30 to 32½
Phosphor Copper, 5% " "	19 to 21
Phosphor Copper, 10% to 15%, guaranteed " "	28 to 30
Manganese Copper, 30% " "	30 to 35
Phosphor Tin " "	34 to 36
Brass Ingot, Yellow " "	9 to 10
Brass Ingot, Red " "	12 to 13
Bronze Ingot " "	11 to 12
Manganese Bronze " "	17 to 19
Phosphor Bronze " "	13 to 16
Casting Aluminum Alloys " "	29 to 35
PHOSPHORUS—Duty 18c. per lb. According to quantity	30 to 35

PRICES OF SHEET COPPER.

BASE PRICE, 18 Cents per Lb. Net.

PRICES MENTIONED BELOW ARE FOR QUANTITIES OF 100 LBS. AND OVER.

SIZE OF SHEETS.		64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60.	Lighter than 8 oz.
		Cents Per Pound Over Base Price for Soft Copper.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	1	2	3	6	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	3	6	9	
	Longer than 96 inches.	"	"	"	"	2	6			
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	"	"	"	"	2	4	7	10	
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	2	6	9		
	Longer than 96 inches. Not longer than 120 inches.	"	"	"	1	3				
	Longer than 120 inches.	"	"	1	2					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	"	"	1	2	4	7	10		
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	5	8			
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	8				
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	6	11			
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	9				
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6					
	Longer than 120 inches.	1	2	4	8					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10					
	Longer than 120 inches.	1	3	8						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						
	Longer than 96 inches. Not longer than 120 inches.	2	4	7						
	Longer than 120 inches.	3	5	9						
Wider than 108 ins.	Not longer than 132 inches.	4	6							
	Longer than 132 inches.	5	8							

The longest dimension in any sheet shall be considered as its length.

CIRCLES, SEGMENTS AND PATTERN SHEETS, advance over prices of Sheet Copper required to cut them from. 3 cents per pound.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot, and heavier, add 1 " " "

COLD OR HARD ROLLED COPPER, lighter than 14 oz., per square foot, add 2 " " "

POLISHED COPPER, 20 INCHES WIDE and under, advance over price for Cold Rolled Copper of corresponding dimensions and thickness 1 " " sq. ft.

POLISHED COPPER, WIDER THAN 20 INCHES, advance over price for Cold Rolled Copper of corresponding dimensions and thickness 2 " " " "

COLD ROLLED COPPER, PREPARED SUITABLE FOR POLISHING, same as Polished Copper of corresponding dimensions and thickness.

COLD ROLLED AND ANNEALED COPPER SHEETS OR CIRCLES, same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

ROUND COPPER ROD, ⅜ inch diameter or over.....Base Price.

(Rectangular, Square and Irregular Shapes, Copper Rod, Special Prices.)

ZINC—Duty, sheet, 2c. per lb.	Cents per lb.
Carload lots, at mill	6.75 less 8%
Casks	7.25
Open casks	7.75

Metal Prices, June 11, 1909

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect May 1, 1909, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13	$0.15	.16½
Wire	.13¼	.15¼	.16¾
Rod	.13¼	.15¼	.17¾
Brazed tubing	.19⅜	—	.21½
Open seam tubing	.17⅞	—	.19½
Angles and channels, plain	.17⅞	—	.19½

50% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass..	½c.	per lb. net advance
" —Best spring, drawing and spinning brass....	1½c.	" " " "
Wire—Extra spring and brazing wire.....	½c.	" " " "
" —Best spring and brazing wire.....	1c.	" " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14	$0.16	$0.17½
Wire	.14¼	.16¼	.17¾
Rod	.14¼	.16¼	.18¾
Brazed tubing	.20⅜	—	.22½
Open seam tubing	.18⅞	—	.20½
Angles and channels, plain	.18⅞	—	.20½

5% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass...	½c.	per lb. net advance.
" —Best spring, drawing and spinning brass....	1½c.	" " " "
Wire—Extra spring and brazing wire	½c.	" " " "
" —Best spring and brazing wire.....	1c.	" " " "

BARE COPPER WIRE—CARLOAD LOTS.

15c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	18½c. per lb. base.
100 lbs. to 300 lbs. in one order	19c. " " "
Less than 100 lbs. in one order	20½c. " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in O. D. Nos. 4 to 13 Stubs' Gauge, 18c. per lb.
Seamless Copper Tubing, 22c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	26	25	20	19	18	18	18	18	18	18	18	19	20	22	24	25

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Munts or Yellow Metal Sheathing (14" x 48")	14c. lb. net base
" " " Rectangular sheets other than Sheathing	16c. " " "
" " " Rod	15c. " " "
Tobin Bronze Rod	17c. " " "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough 21¼c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quantity.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

No.	Wider than..... and including..... in coils. 8in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
No. 13 and heavier	34	34	36	36	36	36	39	39	39
" 14	34	34	36	36	36	36	39	39	39
" 15	34	34	36	36	36	36	39	39	39
" 16	34	34	36	36	36	36	39	39	39
" 17	34	34	36	36	36	36	39	39	39
" 18	34	34	36	36	36	36	39	39	42
" 19	34	34	36	36	36	36	39	40	43
" 20	34	36	36	36	36	38	41	42	44
" 21	34	38	38	38	38	40	43	44	50
" 22	34	38	38	38	40	40	43	47	51
" 23	34	38	38	38	40	40	43	49	52
" 24	34	38	40	42	42	42	45	51	54
" 25	36	39	41	43	43	43	46	53	57
" 26	36	39	42	46	46	46	51	55	61
" 27	36	40	44	48	48	49	54	58	64
" 28	36	40	46	48	49	49	56	62	67
" 29	38	41	48	50	52	52	61	67	72
" 30	38	42	50	52	56	62	69	72	77
" 31	43	47	55	58	63	71	74	77	83
" 32	45	49	57	61	69	77	91	90	95
" 33	47	51	60	65	73	84	91	100	110
" 34	50	55	62	70	78	91	103	110	120
" 35	..	65	70	80	90	100	115	125	..
" 36	..	80	90	100	115	120	135	..	..
" 37	..	104	114	129	144	159	174	..	..
" 38	..	124	139	154	169	184	204	..	..
" 39	..	144	164	184	204	224	..	..	..
" 40	..	174	204	224	244	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 3 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are 100 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GAUGE THE STANDARD. SIZES CARRIED IN STOCK.
Outside Diameters. BASE PRICE, 25 Cents per Pound.

Stubs' Guage.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 ins.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	26	23	..	..	13	11	9	8	15	22
12.	.109.	..	..	..	..	..	..	..	25	..	..	..	14	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
16.	.065.	..	..	..	..	..	27	26	26	23	22	20	20	29	20	26	30	56
18.	.049.	..	..	..	..	32	29	28	27	24	25	25	25	..	..	..	..	..
20.	.035.	116	..	45	38	33	32	31	29	28	29	29	29	30	37	48	57	80
21.	.032.	..	..	..	39	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.	137	97	47	41	37	36	34	33	..	..	44	..	..	..	..	..	..
24.	.022.	187	132	107	87	78	72	61	59	65	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge.	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb. ...	32	32½	32½	33	33½	34	34½	35	36	37	38	43	46

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4	per cent.	to No.	19, B. & S. Gauge, inclusive		$0.60
6	"	"	19,	" " "	.70
9	"	"	19,	" " "	.85
12	"	"	19,	" " "	1.00
15	"	"	19	" " "	1.15
16	"	"	19,	" " "	1.20
18	"	"	19,	" " "	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quality and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

Our steady customers include many of the largest consumers in this country and Canada

PLATING FOR THE TRADE

Brass Plating, Copper Plating, Nickel Plating,
Silver Plating, Tinning, Etc.

Small Articles in Large Quantities from One
Cent to Five Cents Per Pound

NOT A NEW HOUSE—ESTABLISHED 1850

See Page 40 for Want Advertisements

DIRECTORY

METAL ROLLING MILLS.

INGOT, SHEET, ROD, WIRE, TUBE, METAL GOODS.

HENDRICKS BROTHERS
Manufacturers of
Sheet and Bar Copper
COPPER FIREBOX PLATES
and STAYBOLTS
WIRE and BRAZIER'S RIVETS
IMPORTERS AND DEALERS IN
INGOT COPPER, BLOCK TIN,
SPELTER, LEAD, ANTIMONY
BISMUTH, NICKEL, Etc.
49 Cliff Street, NEW YORK

Established 1802 Cable Address: "Scovill"
SCOVILL MFG. CO.
WATERBURY, CONN.
THE LARGEST AND MOST FULLY EQUIPPED BRASS ROLLING MILLS AND METAL GOODS MANUFACTURING ESTABLISHMENT IN THE WORLD
Estimates for Specialties in Brass, German Silver and Aluminum furnished on application. DEPOTS:
NEW YORK: 75 Spring St. BOSTON: 170 Summer St. CHICAGO: 210 Lake St.

WATERBURY BRASS CO.
General Offices, Mills and Factories.
Waterbury, Conn.
NEW YORK OFFICE, 99 JOHN STREET.
Providence (R. I.) Store, 131 Dorrance St.
Shipments Upon Receipt of Order
From Large Stock of
SEAMLESS DRAWN BRASS AND COPPER TUBING
BRASS {SHEET ROD WIRE
COPPER {SHEET ROD WIRE
GERMAN SILVER {SHEET ROD WIRE
AT WATERBURY

Non-Corrosive Finest Quality
COPPER AND YELLOW
(Muntz) Metal
Naval Brass
Naval Bronze
Manganese Bronze
Plates, Sheets, Bolts, Bars, Rods, Nails, Tacks, &c.
Taunton-New Bedford Copper Co.
NEW BEDFORD, MASS.
77 Water St., New York 61 Batterymarch St., Boston

C. G. HUSSEY & CO.
PITTSBURGH, PENNA.
Manufacturers of
COPPER
In Sheets, Plates, Rolls
ANODES
Tacks and Nails

Bridgeport Brass Co.
BRIDGEPORT, CONN.
Postal Telegraph Building,
Broadway and Murray St, New York
17 N. 7th Street, Philadelphia
Manufacturers of
Brass and Copper { Sheet Tubing Wire and Rods.
Metal Goods Made to Order from Sheet, Rod, Wire and Tubing

BRASS and COPPER in Sheets and Rolls
SILVER PLATED METAL (for Coach Lamps)
BRITANNIA METAL
B. & M. BABBITT METAL for Bearings
LINING METAL for Automobile Bearings and Copper for Electrical Purposes
H. K. & F. S. BENSON
GLEN RIDGE, N. J.

THE SEYMOUR MFG. CO.
SEYMOUR, CONN.
German Silver
BRASS, COPPER and BRONZE IN SHEETS, WIRE, RODS and TUBES
COPPER AND NICKEL ANODES
Resistance Wires, Wire, Shot Copper

UNITED WIRE & SUPPLY COMPANY
109 SUMMER STREET,
PROVIDENCE, R. I.
SEAMLESS BRASS and COPPER TUBING 1" O. D. and smaller in thin gauges. Lightning Rod Points and other tapered tubes.

The Ansonia Brass and Copper Co.
99 John St., New York
MANUFACTURERS OF
BRASS and COPPER Sheets, Tubes, Rods and Wire
SOLE MANUFACTURERS TOBIN BRONZE
(Trade-Mark Registered)

PHENIX TUBE CO.
Manufacturers of
Brass and Bronze Iron Lined Tubes
Brazed Steel Tubes,
Round and Square.
Main Office and Mills: Brooklyn, N. Y. City Branch Offices: Chicago, San Francisco

Baltimore Copper Smelting and Rolling Company
BALTIMORE, MARYLAND
SHEET COPPER

"RIVERSIDE" German Silver Phosphor Bronze
Sheets, Rods, Wire, Ingots, Castings, Jewelers' Bars and Alloys
The Riverside Metal Co.
Riverside, Burlington Co., N. J.

See Page 52 for Advertisement of The Phosphor Bronze Smelting Co.

SEE PAGE 40 FOR WANT ADVERTISEMENTS

DIRECTORY

METAL ROLLING MILLS.

INGOT, SHEET, ROD, WIRE, TUBE, METAL GOODS.

THE FRENCH MFG. CO.
154 ROBBINS ST
WATERBURY, CONN
Manufacturers of
SEAMLESS
Brass, Copper, Bronze and White Metal
Thin Gauges
Small Sizes
TUBING
SPECIALTIES:
Irregular Shapes, Solid Drawn Work and Hydro-Carbon Lighting Tubing

A. H. Wells & Co.
WATERBURY, CONN.
MANUFACTURERS OF
SEAMLESS.... NICKEL SILVER, BRASS, COPPER, BRONZE AND PURE COPPER **TUBING**
TUBING FOR ELECTRICAL PURPOSES
Odd and Special Shapes, and Small Tubing, a Specialty
—ALSO THE—
Bourdon Steam Gauge Springs
All sizes from 8 to 36, B. & S. Gauge.

The BUFFALO TUBE CO.
255 RANO STREET
BUFFALO, N. Y.
SMALL SIZES
Seamless Brass and Copper Tubing
PROMPT DELIVERY

The Slade Tubing Co.
INCORPORATED
Main Office and Mill:
Pawtucket, R. I.
SEAMLESS BRASS AND COPPER TUBE
1" O. D. and Smaller
Small Sizes and Thin Gauges
Seamless Low Brass Lighting Tubes for Gasoline Lighting Systems a Specialty

THE PILLING BRASS CO.
WATERBURY, CONN.
Brass and German Silver
6 in. and narrower
.005 and thinner
PLATERS' METAL A SPECIALTY

SEAMLESS STEEL TUBING
From 3 in. Diameter to 1-64 in.
Finished Bright, Smooth and Accurate to 1-1000 in. Inside and Out
Tool Steel Tubing. Soft Steel Tubing. Also Small Brass, Copper and Aluminum Tubing.
ELLWOOD IVINS TUBE WORKS
Oak Lane Station, Philadelphia, Pa.

LINTON & CO.
95 PINE STREET PROVIDENCE, R. I.
MANUFACTURERS OF
SEAMLESS BRASS . . **TUBING**
In Small Sizes
GOLD SOLDER, sheet or wire.
SILVER SOLDER, sheet or wire.
SHEET BRASS SOLDER

We Sell Ingot Copper, Bar Tin, Bar Lead, Ingot Aluminum and Cube Nickel

STANDARD ROLLING MILLS
363 Hudson Avenue, Brooklyn, N. Y.
Refiners and Rollers for the Trade
SHEET BLOCK TIN, BRITANNIA AND BLACK METAL
ROLLED PROMPTLY AT REASONABLE PRICES
Inquiries Solicited.
We Also Make WHITE METAL and ANTIMONIAL LEAD CASTINGS for Novelty Manufacturers.

THIS SPACE FOR SALE
Send for Rates

WM. F. RENZIEHAUSEN CO.
Rollers of Silver Anodes and Sterling Silver
ALSO DEALERS IN
FINE GOLD AND SILVER
43-47 Oliver St., Newark, N.J.
Long Distance Phone 3739 R.

Established 1859. Long Distance 'Phone.
John Toothill
White Metal Rolling Mill
Casting, Rolling and Refining for the trade.
Sheet Block Tin and Britannia
ROCHELLE PARK, NEW JERSEY.

ROLLED FIRELESS STERLING SILVER
SILVER SOLDERS, ANODE SILVER and SILVER WIRE
For further information address
JOHN J. JACKSON CO.
91 Mechanic St. NEWARK, N. J.

THIS SPACE FOR SALE
Send for Rates

SEE PAGE 40 FOR WANT ADVERTISEMENTS

NATIONAL SHEET METAL CO.

Manufacturers of **PLATED SHEET METALS**

Nickelzinc, Brasszinc, Copperzinc, Bronzezinc, Nickeltin, Brasstin, Coppertin, Bronzetin
Sheet Zinc, polished and unpolished, for stamping

LARGE SAVING TO MANUFACTURERS — LAST YEAR'S SALES, 1,000,000 LBS.

For Further Information Address **Office: PERU, ILLINOIS**

ST. JOSEPH LEAD COMPANY

Pig Lead

5 Nassau St., New York

Horsehead Spelter

The Original Brand of Pure Spelter

Indispensable in the manufacture of

Cartridge Metal, German Silver, Fine Spun Work, Fine Castings, Superior Alloys, &c.

THE NEW JERSEY ZINC CO.

Empire Building,
71 Broadway, New York

ILLINOIS ZINC COMPANY

Manufacturers of

Spelter, Sheet Zinc, and Sulphuric Acid

PERU, ILL.

W. FISHER, Agent, 81 and 83 Fulton St., New York City

Telephone, 139 Beekman

High Grade Spelter

GOLDEN ROD BRAND

Suitable for High Grade Brass Work, Cartridge Metal, Etc.

Brazing Solder

H. M. Shimer & Co.

19th Street and Washington Ave.
PHILADELPHIA, PA.

Sandoval Zinc Co.

Manufacturers of

HIGH GRADE SPELTER

SUITABLE FOR ALL PURPOSES

General Offices:

120 N. Peoria Street, Chicago, Ills.

Works: Sandoval, Ills.

Matthiessen & Hegeler Zinc Co.

LA SALLE, ILLINOIS

Smelters of Spelter

AND MANUFACTURERS OF

Sheet Zinc and Sulphuric Acid

Zincs for Leclanche Battery

Special sizes of Zinc to order. Rolled Battery Plates. Selected Plates for Etchers' and Lithographers' use. Selected Sheets for Paper and Card Makers' use. Stove and Washboard Blanks.

High-Grade Spelter and Sulphuric Acid

HEGELER BROTHERS, DANVILLE, ILL.

Cold Rolled Zinc

IN COILS FOR

Drawing and Stamping

THE PLATT BROS. & CO.

WATERBURY, CT.

THIS SPACE
FOR SALE

SEE PAGE 40 FOR WANT ADVERTISEMENTS.

DIRECTORY

METAL SMELTERS, REFINERS, DEALERS.

BUYERS AND SELLERS OF NEW AND OLD METALS.

Illinois Smelting & Refining Co.

122 N. Peoria Street, Chicago, Ill. Cable Address "Smelref," Chicago

Manufacturers of

Pig and Bar Lead, Spelter, Babbitt Metals
Linotype, Stereotype, Monotype and Electrotype
Metal, Yellow Composition and Phosphor Ingots

Dealers in New and Old Metals, and the Largest Buyers of Zinc Dross, Skimmings, Sal Skimmings, Scrap Zinc and Aluminum

THE MORTON B. SMITH CO.

241 and 243 Front St., New York

Offer For Sale:

Heavy Copper and Wire
Ready for the Crucible

Composition
Carefully Selected

Heavy Yellow Brass
Free from Iron

Old Metals Generally

Want to Buy:

Turnings, Drosses,
Grindings, Residues

THEODORE HOFELLER & CO.

BUFFALO, N. Y.

Our Specialties

Heavy Copper and Copper Wire Cut in Crucible Shape.

Number One Red Brass Scrap.

Heavy Yellow Brass Scrap.

Eagle Smelting & Refining Works

734-740 EAST 14th STREET, NEW YORK CITY

Manufacturers of

Solder, Type Metals, Babbitt Metals
and White Metal Alloys

Smelters of Drosses of All Kinds — Dealers in New and Old Metals

Pittsburg Smelting & Refining Co.

Dealers in

Brass Foundry Tailings, Emery Grindings, Magnetic Separator Tailings, Copper Scales, Brass Skimmings, Zinc Oxide, Sal Ammoniac Skimmings, Etc.

Send us Samples of what you have to Sell

P. O. Box 203 — Greensburg, Pa.

Shonberg's Ⓢ Bearing Metal

M. M. GRADE

Has the best wearing qualities, with the strength and tenacity of phosphor bronze. We claim SUPERIORITY for our "M. M. GRADE" over all other Bearing Metals on the market. We want you to convince yourself by testing and will be pleased to send a sample on request.

I. SHONBERG, 363 Hudson Ave., BROOKLYN, N.Y.

ALUMINUM

INGOTS ROD GRANULATED

PURE AND ALLOYS

ALUMINUM SOLDER DOES THE WORK AND STAYS DONE

U. S. REDUCTION COMPANY,
CHICAGO

S. Birkenstein & Sons

62-72 E. Ontario St., CHICAGO, ILL.

New and Old Metals

of every description bought and sold. We also carry a complete line of foundry supplies.

Globe Metal Company

Office: 68 E. Ontario Street
Works: 434 W. Lake Street
CHICAGO, ILL.

INGOT BRASS

Specialties: Phosphor Bronze and Brass Ingot manufactured according to specifications. We buy: Brass Borings and Turnings, Brass Grindings, Brass Foundry Ashes, Residues of all kinds

SEE PAGE 40 FOR WANT ADVERTISEMENTS

DIRECTORY

METAL SMELTERS, REFINERS, DEALERS.
BUYERS AND SELLERS OF NEW AND OLD METALS.

The **CRESCENT**
Phosphorized Metal Co.
PHILADELPHIA, PA.
Manufacturers of High Grade PHOSPHOR TIN, PHOSPHOR BRONZE, PHOSPHOR COPPER, Containing up to 15% Phosphorus. MANGANESE COPPER.
Also Dealers in PHOSPHORUS. Lowest Market Prices.

MAGNESIUM METAL
Improves the Strength of
Copper, Brass, Bronze, Aluminum, Nickel, Zinc Mixtures
NOTE: Always Specify "LEAVITT'S" BRAND
C. W. LEAVITT & CO.
1810 CORTLANDT BLDG. NEW YORK

TELEPHONE, BRIDGE 1519. LOCK BOX 103.
SANDOVAL ZINC CO.
Chemical Department
EAST ST. LOUIS, ILLS.
Manufacturers of Soldering Flux, Commercial Salts, and Chloride of Zinc in Fused, Granulated and Liquid form.
The Granulated Chloride of Zinc is indispensable, as a flux, to Brass, Copper and Aluminum Founders.
Put up in 50 and 100 lbs. iron packages.
Price 10 cents per pound delivered in the United States.

Wm. F. Renziehausen Co.
GOLD AND SILVER REFINERS
SWEEP SMELTERS, ASSAYERS AND ANALYTICAL CHEMISTS
Full value paid for any material containing Gold, Silver and Platinum
43-47 Oliver St., NEWARK, N. J.
LONG DISTANCE PHONE, 3759-R

We Sell Yellow-Brass Ingot
We Buy Yellow-Brass Turnings
WHIPPLE & CHOATE, Bridgeport, Conn.

ALBERT A. MOERS
24 Stone Street New York
FOR SALE
Aluminum, Antimony, Antimonial Lead, Tin, Cadmium
WANTED
Zinc Dross, Zinc Ashes, Flux Skimmings

THIS SPACE FOR SALE.

THIS SPACE
FOR SALE
SEND FOR RATES.

THIS SPACE
FOR SALE
SEND FOR RATES.

THIS SPACE
FOR SALE
SEND FOR RATES.

THIS SPACE
FOR SALE
SEND FOR RATES.

SEE PAGE 40 FOR WANT ADVERTISEMENTS.

DIRECTORY

METAL FOUNDERS, FINISHERS AND SHEET METAL WORKERS.

ALUMINUM GOODS MFG. CO.

Fancy Goods
Combs
Boxes
Screw Caps
Spinning
Signs
Advertising Novelties
Printing
Numbers and Letters
Cooking Utensils
Hardware Lines
Models

BRANCH OFFICES AND SALESROOMS
New York Chicago

HOME OFFICE
NEWARK, N. J.

FACTORIES
Newark, N. J. Two Rivers, Wis.
Manitowoc, Wis.

EVERYTHING IN
ALUMINUM

SPECIAL GOODS made to order.
Correspondence Solicited.

CASTINGS

THE LIGHT MANUFACTURING & FOUNDRY COMPANY

POTTSTOWN, PA.

Are the Original and Only Manufacturers of

Automobile Brand Aluminum Castings

Our Aluminum Castings are especially adapted to Automobile, Auto Boat and Electrical Construction.

THE LARGEST EXCLUSIVELY ALUMINUM FOUNDRY IN THE UNITED STATES.

The Fairfield Aluminum Foundry Corp.

FAIRFIELD, CONN. (Bridgeport, Suburb)

Originators and Sole Manufacturers of the famous Lion Brand

ALUMINUM CASTINGS

We are specialists in Aluminum work for Automobile, Government work and Electrical Construction.

THE FAIRFIELD ALUMINUM FOUNDRY CORP., Fairfield, Conn

THE BUCKEYE ALUMINUM CO.

DOYLESTOWN, OHIO

MANUFACTURERS

COOKING UTENSILS | SPECIALTIES CASTINGS

SEE PAGE 40 FOR WANT ADVERTISEMENTS

METAL FOUNDERS, FINISHERS AND SHEET METAL WORKERS.

TO USERS OF

WHITE METAL CASTINGS

Owing to a lighter demand at this season than usual for Portables and White Metal Novelties we can take on White Metal Casting Work to a limited extent in our foundry. This is an unusual chance to get high-grade castings at reasonable prices.

F. H. LOVELL & COMPANY, Arlington, N. J.

CASTINGS

BRASS, BRONZE, ALUMINUM
PHOSPHOR BRONZE
MANGANESE BRONZE

Large castings a specialty, 1000 to 3000 lbs. and up

CLUM & ATKINSON

571 Lyell Avenue :: :: ROCHESTER, N. Y.

ROCHESTER **PERFORATING** COMPANY

Perforated Metals for all Purposes

Special Stamping

"Get our prices" 70 Factory St., ROCHESTER, N. Y.

THIS SPACE FOR SALE

SEND FOR RATES

METAL SPINNING

JOHN J. POLE, Geneva, N. Y.

We Solicit Your Work.

METAL ETCHERS, PLATERS AND POLISHERS

ETCHING OF METALS

I have had 37 YEARS of practical experience in etching knives, razors, scissors, hammers, axes, revolvers, clock dials, sign plates, door plates.

For a liberal compensation I will teach my process to manufacturers and fit up plants.

I make a specialty of etching plates in steel, copper, brass and zinc for transferring and embossing. Also silverware, including such articles as mirror, brush and comb backs, book and album covers, trays, souvenir spoons and similar articles.

MAX SCHWEIZER

113 Kossuth Street, (P. O. Box 943) **BRIDGEPORT, CONN., U. S. A.**

Roy Williams

FREMONT, OHIO

ELECTRO-PLATING

SAFETY RAZORS A SPECIALTY

GLOBE PLATING COMPANY

Electro Galvanizing

Hot Galvanizing

Gold, Silver, Nickel, Copper and Brass Plating
OXIDIZING AND POLISHING
Enameling and Japanning

180 Orange Street, MANSFIELD, OHIO

SEE PAGE 40 FOR WANT ADVERTISEMENTS

PROFESSIONAL MEN AND EXPERTS

LANGDON MOORE,
Counsellor at Law and Patent Attorney
PATENTS, TRADE-MARKS, DESIGNS and COPYRIGHTS
Washington Loan and Trust Bldg., Washington, D.C.
Formerly Examiner U. S. Patent Office

HUGH L. THOMPSON
CONSULTING ENGINEER
Waterbury, Conn., U. S. A.
COMPLETE ESTIMATES and Plans (including Power) for Brass and Copper Sheet, Rod, Wire and Tube Mills prepared, or your present departments redesigned and the latest improved American devices and machines installed.

P. O. Box 91 NEWARK, N. J.
FREDERICK B. FLINN
Analytical Chemist and Assayer
CONTRACT WORK A SPECIALTY
10 N. Maple Ave. East Orange, N. J.

THE HENRY SOUTHER ENGINEERING CO.
Engineers, Metallurgists and Analysts
440 Capitol Avenue HARTFORD, CONN.

GEORGE C. DAVIS
Analytical and Consulting Chemist
39 So. Tenth St. Philadelphia
ANALYSES OF ALLOYS, IRON, COAL, SAND, CLAY, CEMENT AND ORES
Established 1900

CONTROL
YOUR MIXTURES BY EMPLOYING
Experienced Chemists and Metallurgists
Accurate Analyses at Moderate Prices
THE DETROIT TESTING LABORATORY
1111 Union Trust Building DETROIT, MICH.
MEET US AT THE CONVENTION

CHARLES L. CONSTANT
Analytical Chemist and Metallurgical Engineer
Official Chemist of the New York Metal Exchange
61 Beekman Street NEW YORK

CHARLES H. PROCTOR
CONSULTING PLATER
Instructions and Formulas in all lines of plating, coloring and dipping
621 CHESTNUT STREET ARLINGTON, N. J.

LOUIS J. KROM
Consulting Metallurgist
Non-Ferrous Alloys a Specialty
61 Beekman Street NEW YORK

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For Sale
SEND for RATES

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For Sale
SEND for RATES

For Index of Advertisements
See Pages 45, 46, 47 and 48

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

METALS, MACHINERY AND SUPPLIES FOR SALE

FOR SALE

One No. 2 Double-chamber Rockwell Furnace
One Schwartz Furnace, and
Three Root Pressure Blowers

ALL IN FIRST-CLASS RUNNING CONDITION

Address FURNACE, care THE METAL INDUSTRY

COPPER AND BRASS SCRAP — LEAD AND COPPER
WASTE AND BELTING — IRON AND MACHINERY
Bought and Sold. Write Particulars
WALSH'S SONS & CO., Newark, N. J.

FOR SALE.—A splendidly equipped BRASS PLANT, manufacturing plumbers' and water works goods. Latest type machinery, almost new. Complete system of high grade BRASS and ALUMINUM PATTERNS. $3,500 required. This is a money maker for the right party. No other plant of its kind in the South. Address SOUTHERN BRASS WORKS, 1127 CHANDLER BUILDING, ATLANTA, GA.

FOR SALE.—Second-hand ROLLING MILL in good condition. Made by the Waterbury Farrel Foundry and Machine Company. Roll 12" by 20". Price very low. For further particulars address BOX 617, Waterbury, Conn.

FOR SALE.—SPINNING LATHE, 36" swing. First class condition. Can be bought cheap. Apply by letter or in person, EBERHARD & JIMMERSON, 9 CALENDAR ST., PROVIDENCE, R. I.

FOR SALE.—Plating Tanks. Changing to larger capacity. Will sell six 5-ft. Cypress Plating Tanks. All in good order, cheap. SHELTON COMPANY, SHELTON, CONN.

FOR SALE.—FOREIGN PATENTS on a TILTING CRUCIBLE FURNACE for melting Copper, Brass, Aluminum, etc. Address TILTING, care THE METAL INDUSTRY.

FOR SALE.—One No. 2 HAWLEY (Schwartz) FUEL OIL FURNACE for melting Copper, Brass, etc. Good as new. Address HENRY ORME'S SONS, 626 ARMSTRONG AVENUE, ST. PAUL, MINN.

PLATING DYNAMOS, also alternating and direct current motors and dynamos at bargain prices, all makes and sizes bought, sold and repaired. Department F. EUGENE L. RICHTER ELECTRIC CO., N. E. Cor. Uber and Columbia avenue, Philadelphia, Pa.

FOR SALE—One No. 4 LITTLE GIANT Zucker & Levett & Loeb Plating Dynamo, 8 volts, 250 amperes. Price reasonable; condition, first class. Address GIANT, care THE METAL INDUSTRY.

WANTED—Copies of THE METAL INDUSTRY for the months of MAY, 1906, NOVEMBER and DECEMBER, 1908. Anyone having the above mentioned copies, kindly advise THE METAL INDUSTRY.

J. P. FANNING, machinist, 678 Jefferson avenue, Brooklyn, N. Y.—Maker of Moulds for Casting Solder, Babbitt Metal, Bar Lead, etc. We also manufacture small work. Write for particulars.

METALS, MACHINERY AND SUPPLIES WANTED

We are in the market for
LEAD AND ZINC SCRAP
FOR SALE: YELLOW AND COMPOSITION INGOTS
McLAUGHLIN'S SONS COMPANY, Brooklyn, N. Y.

WANTED—A second-hand CINDER CRUSHER and WASHING MILL. Write stating full particulars, CRUSHER, care THE METAL INDUSTRY.

WANTED—A second-hand DYNAMO of 1,000 amperes or upward for duplex copper work. Address DUPLEX, care THE METAL INDUSTRY.

CASH PAID for bronze Powder Waste, Gas Mantle Dust, Bismuth, Nickel Mercury, Platinum, Osmoiridium and similar metals in any form. JOSEF RADNAI, 36 Fulton street, New York.

WANTED—Some good selling specialties for HARDWARE, AUTO or similar trades. N. STAFFORD COMPANY, 67 Fulton street, New York.

OPPORTUNITIES

BRASS FOUNDERS

Practical information bureau, 40 years' experience with trade secrets, from the furnace to the finisher. Work in all known metals, from common brass to the secret process of tempering copper. 40 formulas, worth a thousand dollars.

PREPAID TO ANY ADDRESS ON RECEIPT OF FIVE DOLLARS.

JAMES ALLEN
2552 J Street, : : : SAN DIEGO, CAL.

British New Patents Act

Advertiser is desirous of undertaking the manufacture of American patents in England. Stamped work of all description. Aluminum work a specialty.

WILFRED & CO., Ltd.
BIRMINGHAM, ENGLAND

PLATERS

By enclosing ten cents in stamps we will forward you one of our anode protectors which will save you work and employer money and keep your solution in better condition than formerly. Address,

PLATERS NOVELTY COMPANY
Box 26, Woodhaven, L. I., N. Y.

WANTED.—A BRASS, IRON, STOVE PLATE, ZINC FOUNDRY and Plating Works in San Francisco, Cal., wishes to manufacture good paying HARDWARE SPECIALTIES and NOVELTIES, such as electric heaters, plated brass goods, etc. Address Louis Gaenicke, 231 Madison street, San Francisco, Cal.

GOOD SALES, GOOD EQUIPMENT, GOOD ASSISTANTS and GOOD POSITIONS may be obtained by the insertion of a METAL INDUSTRY WANT.

INQUIRIES

Inquiry 98.—We have an alloy that we would like to have rolled in sheets of about 16 gauge.

Inquiry 99.—We would like to correspond with manufacturers of rolled brass door sills.

Inquiry 100.—We would like to hear from firms who can furnish barium chloride used in hardening steel, etc.

Inquiry 101.—We would like to correspond with firms who do enameling, such as applied to bath-tubs, etc.

Inquiry 102.—We would like to hear from firms making a glass grinder.

Inquiry 103.—We would like to hear from firms who can furnish German silver hinges for tea and coffee pots.

Inquiry 104.—We would like to hear from firms selling phosphor copper.

Inquiry 105.—We would like to hear from firms manufacturing silver anodes which will not turn black.

Inquiry 106.—We would like to correspond with firms manufacturing flatware blanks for plating.

SITUATIONS OPEN—Founders

WANTED.—A first-class, up-to-date MOLDER and MIXER in ALUMINUM and BRASS to take charge of a foundry with a capacity of seven to ten tons per day. Must be capable of handling MOLDING MACHINES and experienced in AUTOMOBILE CASTINGS. Must give reference with full information regarding the character of work handled, also state salary desired. Address MOLDING MACHINE FOREMAN, care THE METAL INDUSTRY.

WANTED—A SUPERINTENDENT for BRASS FOUNDRY and MACHINE SHOP. One who is capable of making a success in a brass foundry and machine shop manufacturing light and heavy castings and car trimmings. Must understand detail work and be a good estimator of blue prints. Good salary and interest in concern for right party. Write giving full particulars, BOX M-3, care THE METAL INDUSTRY.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

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SITUATIONS OPEN—Founders—Continued

WANTED—FOREMAN, thoroughly familiar with mixtures and practical, economical management of BRASS and ALUMINUM FOUNDRY. Good salary and future prospects. Prefer a man at present employed. For full particulars address PROSPECTS, care THE METAL INDUSTRY.

WANTED—SUPERINTENDENT, energetic, ambitious and thoroughly experienced in every respect for BRASS and ALUMINUM FOUNDRY. Excellent position with opportunity for interest in the business. Address ENERGETIC, care THE METAL INDUSTRY.

WANTED—Up-to-date MOLDER and MIXER in BRASS and ALUMINUM, capable of taking entire charge of foundry running from 10 to 20 tons weekly. Must be first-class molding machine man and preferably one having experience in AUTOMOBILE CASTINGS. Advise fully regarding last two positions, giving names of concerns, how long with each, duties and character of work handled, also salary desired. Address AUTOMOBILE, care THE METAL INDUSTRY.

SITUATIONS OPEN—Salesmen

SALESMAN WANTED
TO SELL
Electro-Platers' and Polishers' Supplies

The LEVETT MFG. CO., Matawan, N. J.

AGENTS WANTED

To sell our **PATENT AUTOMATIC SELF-EMPTYING PLATING** and **GALVANIZING BARRELS**, as well as our other **HANDLING DEVICES, ELECTRO-GALVANIZING PLANTS**, etc.

U. S. ELECTRO-GALVANIZING COMPANY
No. 1-9 Park Avenue
BROOKLYN, N. Y.

SITUATIONS OPEN—Platers and Polishers

WANTED.—FOREMAN for PLATING, POLISHING and BUFFING ROOM. Must be first class on Brass, Bronze, Copper and capable of getting out BUILDERS' HARDWARE in quantities at the lowest cost. Reply stating experience, age and the lowest pay you would expect in a steady place. Address BOX 516, ERIE, PA.

SITUATIONS OPEN—We can offer a good position to a man who thoroughly understands the PRODUCTION of ALL FINISHES, having a knowledge of PLATING, COLORING, USE of POWDERS, etc. If capable of doing such work we should be pleased to hear from you. Address PLATE COMPANY, care THE METAL INDUSTRY.

WANTED.—A PLATER who understands COPPER OXIDIZING and POLISHING. Small plant, little country town. Good place for good man, none other wanted. State wages and experience in first letter. ELMIRA MACHINE WORKS, GROVER, PA.

WANTED.—PLATER with experience on SILVER PLATING BRITANNIA METAL HOLLOW WARE, TOILET WARE, etc. Must understand oxidizing and French Gray work. Address stating experience and wages expected, D. S. CO., care THE METAL INDUSTRY.

SITUATION OPEN—Finishers

WANTED—A first class METAL SPINNER, one capable of doing all kinds of work. Apply IDEAL REGISTER and METALLIC FURNITURE COMPANY, 1255 Military Avenue, Detroit, Mich.

SITUATIONS OPEN—Smelters and Refiners

WANTED—A man who is a PRACTICAL ALUMINUM SMELTER, capable of producing either by fire or electrolytic process, aluminum in ingot, wrought or granulated form. Only an expert in this line need apply. Address P. H. LANGDON, care THE METAL INDUSTRY.

SITUATIONS OPEN—Pattern and Model Makers

WANTED.—An experienced METAL PATTERN and MODEL MAKER. Must be capable of executing first class work from blue print specifications. A man with experience as foreman preferred. In replying give experience and salary expected. Address METAL PATTERN, care THE METAL INDUSTRY.

SITUATIONS WANTED—Executive

Advertisements under Situations Wanted will be inserted for 20 cents per line, 3 lines for Half a Dollar.

SITUATION WANTED.—Is there an up-to-date concern in NEW YORK or the MIDDLE WEST manufacturing BRASS or SHEET or ROD METAL GOODS who has an opening for an up-to-date SUPERINTENDENT? I am open for an engagement. Have had 15 years' experience in the manufacturing of such goods. Expert on modern methods, both factory and office. First class references. Address SHEET METAL GOODS, care THE METAL INDUSTRY.

SITUATION WANTED—As SUPERINTENDENT with a firm manufacturing BRASS METAL GOODS for ELECTRICAL purposes. Best of references from last employer. Address C. D. G., care THE METAL INDUSTRY.

SITUATIONS WANTED—Founders

SITUATION WANTED.—As FOREMAN in BRASS SHOP. Twenty years' experience in STEAM, WATER, GAS and general line of BRASS GOODS, tools and patterns used for this class of work. Modern methods and can handle help to advantage. Address ABBOTT, care THE METAL INDUSTRY.

SITUATION WANTED.—By a MOLDER who has had 14 years' experience on all classes of RAILROAD WORK. Thoroughly reliable in every way. Address E. M. JOHNS, care THE METAL INDUSTRY.

SITUATION WANTED—BRASS FOUNDRY FOREMAN desires a position in a SHIP BUILDING, LOCOMOTIVE or CAR TRIMMING PLANT. Can furnish references. Address M. T., care THE METAL INDUSTRY.

SITUATION WANTED—By a BRASS FOUNDRY FOREMAN who can give good results in MACHINE MOLDING and up-to-date OIL FURNACE practice. Can put your foundry in good working order, enabling you to meet all competition. Address A. B. C., care THE METAL INDUSTRY.

SITUATION WANTED—By a BRASS FOUNDRY FOREMAN who thoroughly understands the business. Desirous of taking charge and working for an interest in the business. Address T. M., care THE METAL INDUSTRY.

SITUATION WANTED—As BRASS FOUNDRY FOREMAN, experienced on green and dry sand and statuary. Thoroughly posted on ALUMINUM and its alloys. First class references. Address DRY SAND, care THE METAL INDUSTRY.

SITUATION WANTED.—By experienced man to make BRASS CASTINGS on MOLDING MACHINES from 12 ounces to 1,200 pounds. Address GLEASON, care THE METAL INDUSTRY.

SITUATION WANTED—Position as FOUNDRY FOREMAN or SUPERINTENDENT in brass. Have had twenty years' experience and can give the best of references. Do my own mixing. Address O-21, care THE METAL INDUSTRY.

SITUATION WANTED.—BRASS FOUNDER with 16 years' experience in all kinds of foundry work. Thoroughly familiar with molding machines, oil furnaces and different mixtures. Have been foreman in several shops and can furnish good reference. Address BOX 203, care THE METAL INDUSTRY.

SITUATION WANTED—BRASS FOUNDRY FOREMAN or SUPERINTENDENT having had full charge of foundry for 20 years manufacturing car, locomotive, automobile and machinery castings. Can furnish the best of references. Address BOX 183, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class BRASS MOLDER who has had a large experience in foundries in the vicinity of New York. Would prefer position near New York. Address BOX 196, care THE METAL INDUSTRY.

TRADE WANTS

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SITUATIONS WANTED—Founders—Continued

SITUATION WANTED—By a CORE MAKER who has had 12 years' experience on all classes of cores, the last three years on CHANDELIER work. Capable of taking charge and can furnish good reference. Address BOX 197, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class CORE MOLDER who has had a large experience in this line. Can furnish reference. Address BOX 198, care THE METAL INDUSTRY.

SITUATION WANTED—By a BRASS MOLDER who has had 20 years' experience in this line. Can furnish reference. Address BOX 201, care THE METAL INDUSTRY.

SITUATIONS WANTED—Finishers

SITUATION WANTED.—A first class BRASS FINISHER and TOOL MAKER. Also expert on experimental work. Address BRASS FINISHER, care THE METAL INDUSTRY.

SITUATION WANTED.—As BRASS TURNER and BENCH hand. Nine years' experience on all kinds of work. Address BENCH, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class BRASS WORKER who has had 10 years' experience on bench, speed lathe, brazing and different kinds of jobbing work. Good reference from last employer. Address BOX 200, care THE METAL INDUSTRY.

SITUATIONS WANTED—Platers and Polishers

SITUATION WANTED.—A FOREMAN PLATER, POLISHER and BUFFER of 23 years' experience is open for engagement. Have been for over 20 years with one of the largest houses in Chicago. Understands all solutions and finishes, has a method of reducing cost and increasing output. Best of recommendations. Has a broad and practical experience in polishin, plating, buffing, dipping and lacquering. Address A. Z., care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER with 20 years' experience on all metals. Can make and run any solution. Capable of taking charge. Address VERDE, care THE METAL INDUSTRY.

SITUATION WANTED by a practical FOREMAN PLATER understanding thoroughly all solutions and finishes. Address PRACTICAL, care THE METAL INDUSTRY.

SITUATION WANTED.—Young man with some experience in nickel plating and oxidizing desires a position as helper, or assistant plater. Address HELPER, care THE METAL INDUSTRY.

SITUATION WANTED.—A PLATER and POLISHER with 15 years' experience desires a position outside of New York City. An excellent opportunity for a firm in a country town to obtain a thoroughly reliable man with good references. Address S. HERRICK, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER and OXIDIZER, also expert on VERDE-ANTIQUE. Twenty years' experience on HARDWARE. Would like to correspond with firms who are in the market for a good man. Address WERNER UNKRIG, 88 Richmond Hill avenue, Stamford, Conn.

SITUATION WANTED.—By a PLATER and BRONZER. Expert on bronze doors, sash and trim, galvano, wood, plaster and cement. Address BRONZER, care THE METAL INDUSTRY.

SITUATION WANTED.—FOREMAN PLATER on Gold, Silver, Nickel, Brass, Tin, Oxidizing, Green Finishes, etc., desirous of going West. Address GOLD PLATER, care THE METAL INDUSTRY.

SITUATION WANTED.—First class JEWELRY COLORER wishes a position. Thoroughly familiar with all kinds of plating and finishing. M. SCHWARTZ, 193 E. 7th street, New York.

SITUATION WANTED—PLATER, familiar with all colors, also plating on non-conducting surfaces such as glass, lace, wood, plaster, etc. Address H. KEPPLER, 149 Engert avenue, Brooklyn, N. Y.

SITUATION WANTED—PLATER with 10 years' experience who has a thorough knowledge of all solutions and finishes, also most modern methods of producing work at the lowest cost. Can furnish first-class reference. Salary moderate to begin. Address M. W., care THE METAL INDUSTRY.

SITUATIONS WANTED—Platers and Polishers—Continued

SITUATION WANTED—By a PLATER with 15 years' experience, thoroughly understanding all solutions, silver deposit, galvano plastic work, etc. Address BOX 169, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER, POLISHER and BUFFER with 15 years' experience. Hustler and can produce good work. Sober, reliable and can furnish the best of reference from my last employer. Would like to locate west of Chicago. Address BOX 150, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class PLATER thoroughly familiar with oxidizing and refinishing. Has had 18 years' experience and is capable of taking charge. Can furnish the best of references. Address BOX 192, care THE METAL INDUSTRY.

SITUATION WANTED—By PLATER, second man on brass, nickel, silver, copper. Understands all finishes. Out of town preferred. Address BOX 132, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER of 16 years' experience, understanding all solutions, including verde antique. Address BOX 172, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER with 12 years' experience, thoroughly understanding 411 details of the plating trade. Can furnish excellent reference. Address BOX 173, care THE METAL INDUSTRY.

SITUATION WANTED—A first class PLATER who is at the present time employed but desires to change, would like to hear from firms desiring a man who thoroughly understands the plating, buffing, etc., of all metals. Address BOX 174, care THE METAL INDUSTRY.

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Ansonia Brass & Copper Co., The, New York.
Baltimore Copper Smelting & Rolling Co., Baltimore, Md.
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Hussey, C. G., & Co., Pittsburg, Pa.
Pilling Brass Co., Waterbury, Conn.
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Scovil Manufacturing Co., Waterbury, Conn.
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Waterbury Brass Co., Waterbury, Conn.

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French Manufacturing Co., The, Waterbury, Conn.
Rome Metal Co., Rome, N. Y.
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Stevens, Frederic B., Detroit, Mich.

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Pangborn, Thos. W., Company, New York.

CRUCIBLES, STOPPERS, NOZZLES, ETC. (see also Foundry Supplies).
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Gautier, J. H., & Co., Jersey City, N. J.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Paige Retort & Crucible Co., Taunton, Mass.
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Mousssette, O. J., Co., Inc., Brooklyn, N. Y.
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Torrington Mfg. Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

DRYING-OUT MACHINES.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Con.

DUST COLLECTORS.
Knickerbocker Co., The, Jackson, Mich.
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Bogue, Chas. J., Electric Co., New York.
Richter, Eugene L., Electric Co., Phila., Pa.

ELECTROPLATING, COLORING, DIPPING, ETC.
Globe Plating Co., Mansfield, O.
Lovell, F. H., & Co., Arlington, N. J.
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Williams, Roy, Fremont, O.

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Schneider, Wm., Brooklyn, N. Y.
Schweizer, Max, Bridgeport, Conn.

FACTORY FURNITURE AND EQUIPMENT.
Cleveland Wire Spring Co., Cleveland, O.

FLASKS, BRASS MOLDERS' (see also Foundry Supplies).
Middleditch, Benj., Detroit, Mich.

FORGINGS, AUTOMOBILE.
American Manganese Bronze Co., New York.
Bliss, E. W., Co., Brooklyn, N. Y.

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Brand, S. H., Co., Chicago, Ill.
Buckeye Products Co., Cincinnati, O.
Dixon, Jos., Crucible Co., Jersey City, N. J.
McKesson & Robbins, New York.
Paxson, J. W., Co., Philadelphia, Pa.
Stevens, Frederic B., Detroit, Mich.

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Birkenstein, S., & Sons, Chicago, Ill.
Brand, S. H., Co., Chicago, Ill.
Detroit Foundry Supply Co., Detroit, Mich.
Middleditch, Benj., Detroit, Mich.
Monarch Eng. & Mfg. Co., Baltimore, Md.
Obermayer Co., The S., Cincinnati, O.
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Paxson, J. W., Co., Philadelphia, Pa.
Richards & Co., Boston, Mass.
Smith, J. D., Foundry & Supply Co., Cleveland, O.
Stevens Frederic B., Detroit, Mich.

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Carborundum Co., Niagara Falls, N. Y.
Stevens, Frederic B., Detroit, Mich.

FURNACES, ANNEALING, BRAZING, ETC.
Bates & Peard Annealing Furnace Co., New York.
Monarch Eng. & Mfg. Co., Baltimore, Md.
Rockwell Furnace Co., New York.
Rockwell, W. S., Co., New York.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

FURNACES, ELECTRIC.
Bristol, The, Co., Waterbury, Conn.
Hoskins, The, Co., Chicago, Ill.

FURNACES, GALVANIZING AND TINNING.
Farrel Foundry & Machine Co., Ansonia, Conn.
Monarch Eng. & Mfg. Co., Baltimore, Md.
Rockwell Furnace Co., New York.
Rockwell, W. S., Co., New York.

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Ideal Furnace Co., Chester, Pa.
Monarch Engineering Manufacturing Co., Baltimore, Md.
Paxson, J. W., Co., Philadelphia, Pa.
Potters Kiln & Tool Works, Chicago, Ill.
Rockwell Furnace Co., New York.
Rockwell, W. S., Co., New York.

FURNACES, REVERBERATORY.
Hawley Down Draft Furnace Co., Chicago, Ill.
Paxson, J. W., Co., Philadelphia, Pa.
Rockwell Furnace Co., New York.

GAS ENGINES.
Otto Gas Engine Works, The, Philadelphia, Pa.

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GERMAN SILVER INGOTS, CASTINGS, ETC.
Riverside Metal Co., Riverside, N. J.
Seymour Manufacturing Co., The, Seymour, Conn.

GERMAN SILVER RESISTANCE WIRE.
Seymour Manufacturing Co., Seymour, Conn.

GERMAN SILVER RIVETS.
Hassall, John, Inc., New York.

GERMAN SILVER SHEETS, WIRE, RODS, ETC.
Pilling Brass Co., Waterbury, Conn.
Reeves, Paul S., & Son, Philadelphia, Pa.
Riverside Metal Co., Riverside, N. J.
Seymour Manufacturing Co., The, Seymour, Conn.
Scovil Manufacturing Co., Waterbury, Conn.
Waterbury Brass Co., Waterbury, Conn.

GERMAN SILVER TUBES.
Riverside Metal Co., Riverside, N. J.
Seymour Manufacturing Co., The, Seymour, Conn.
Scovil Manufacturing Co., Waterbury, Conn.

GOLD ALLOYS.
Riverside Metal Co., Riverside, N. J.

GOLD, CHEMICALLY PURE.
Carpenter, H. F., & Son, Providence, R. I.

GOLD INGOTS, BARS, PLATE, ETC.
Carpenter, H. F., & Son, Providence, R. I.
Leach & Garner Co., Attleboro, Mass.
Rensiehausen, Wm. F., Co., Newark, N. J.
Riverside Metal Co., Riverside, N. J.

GOLD PLATED WIRE AND TUBING.
Leach & Garner, Attleboro, Mass.

GRINDING WHEELS (see also Foundry Supplies).
Carborundum Co., Niagara Falls, N. Y.

GRINDING MACHINERY.
Carborundum Co., Niagara Falls, N. Y.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

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Hoskins Mfg. Co., Detroit, Mich.

HYDRAULIC MACHINERY, JACKS, ETC.
Farrel Foundry & Machine Co., Ansonia, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York.

IRON RIVETS.
Hassall, John, Inc., New York.

IRON, SCRAP, DEALERS IN.
Smith, The Morton B., Co., New York.

IRON TUBES, BRASS AND BRONZE COVERED.
Phenix Tube Co., Brooklyn, N. Y.

JAPANNING OVENS.
Gehnrich, Hermann, New York.

JEWELERS' EQUIPMENT AND SUPPLIES (see also Platers' Supplies).
Carpenter, H. F., & Son, Providence, R. I.
Leiman Bros., New York.

KETTLES, GALVANIZING AND TINNING (see also Platers' Supplies).
Farrel Foundry & Machine Co., Ansonia, Conn.

LACQUERING OVENS.
Gehnrich, Hermann, New York.

LACQUER SPRAYERS.
Eureka Pneumatic Sprayer Co., New York.

LACQUERS, METAL (see also Platers' Supplies).
Celluloid Capon Co., New York.
Egyptian Lacquer Manufacturing Co., New York
New Era, The, Lustre Co., New Haven, Conn.
Nikolas, G. J., & Co., Chicago, Ill.

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Monarch Eng. & Mfg. Co., Baltimore, Md.
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Rockwell Furnace Co., New York.

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LATHES, SPINNING, TURNING, ETC.
Atlas Machine Co., Waterbury, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

LATHES, TURRET.
Abate, W. L., Mt. Vernon, N. Y.
Foster Machine Co., Elkhart, Ind.

LEAD AND BLOCK TIN PIPE.
North American Smelting Co., Philadelphia, Pa.

LEAD, ANTIMONIAL.
Leavitt, C. W., & Co., New York.

LEAD CASTINGS, ANTIMONIAL.
Standard Rolling Mills, Brooklyn, N. Y.
F. H. Lovell & Co., Arlington, N. J.

LEAD, PIG AND BAR.
Hendricks Brothers, New York.
Illinois Smelting & Refining Co., Chicago, Ill.
McLaughlin's Sons Co., Brooklyn, N. Y.
Richards & Co., Boston, Mass.
St. Joseph Lead Co., New York.
Standard Rolling Mills, Brooklyn, N. Y.

LYCOPODIUM.
McKesson & Robbins, New York.

MANGANESE-BRONZE INGOTS AND CASTINGS.
Ajax Metal Co., Philadelphia, Pa.
American Manganese Bronze Co., New York.
Clum & Atkinson, Rochester, N. Y.
Electric Smelting & Aluminum Co., Lockport, N. Y.
North American Smelting Co., Philadelphia, Pa.
Reeves, Paul S., & Sons, Philadelphia, Pa.
Taunton-New Bedford Copper Co., New Bedford, Mass.

MANGANESE-BRONZE SHEETS, RODS, ETC.
American Manganese Bronze Co., New York.
Taunton-New Bedford Copper Co., New Bedford, Mass.

MANGANESE-COPPER.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Electric Smelting & Aluminum Co., Lockport, N. Y.
Lang, R. F., New York.
Roessler & Hasslacher Chemical Co., The, New York.

MANGANESE METAL.
Leavitt, C. W., & Co., New York.
Roessler & Hasslacher Chemical Co., The, New York.

MANGANESE, OXIDE OF.
Leavitt, C. W., & Co., New York.

MANGANESE-SILICON.
Leavitt, C. W., & Co., New York.
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MAGNESIUM-ALUMINUM.
Leavitt, C. W., & Co., New York.

MAGNESIUM METAL.
Leavitt, C. W., & Co., New York.
McKesson & Robbins, New York.
Roessler & Hasslacher Chemical Co., The, New York.

MAGNETIC METAL SEPARATORS (see also Foundry Supplies).
Capitol Brass Works, Detroit, Mich.
Dings Electro-Magnetic Separator Co., Milwaukee, Wis.
Pangborn, Thos. W., Company, New York.
Paxson, J. W., Co., Philadelphia, Pa.

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Anthony, H. M., & Co., New York.
Cleveland Platers' Supply Co., Cleveland, O.
Finkell-Hachmeister Co., Pittsburg, Pa.
International Chemical Co., Camden, N. J.
Stevens, Frederic B., Detroit, Mich.
Swan & Finch Co., New York.

METAL FLUXES (see also Foundry Supplies).
Foundry Specialty Co., The, Cincinnati, O.
Lang, R. F., New York.

METALS, DEALERS IN ALL KINDS OF NEW.
Albert A. Moers, New York.
Birkenstein, S., & Sons, Chicago, Ill.

METALS, DEALERS IN OLD.
Birkenstein, S., & Sons, Chicago, Ill.
Culbert, The John C. Co., Pawtucket, R. I.
Eagle Smelting & Refining Works, New York.
Genesee Metal Co., Rochester, N. Y.
Hofeller, Theodore, & Co., Buffalo, N. Y.
Illinois Smelting & Refining Co., Chicago, Ill.
McLaughlin's Sons Co., Brooklyn, N. Y.
Smith, The Morton B., Co., New York.
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National Sheet Metal Co., Peru, Ill.

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Carpenter, H. F., & Son, Providence, R. I.
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Renziehausen, Wm. F., Co., Newark, N. J.
Riverside Metal Co., Riverside, N. J.

METAL REFINERS—WHITE METAL.
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Riverside Metal Co., Riverside, N. J.
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Eagle Smelting & Refining Works, New York.
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Illinois Smelting & Refining Co., Chicago, Ill.
McLaughlin's Sons Co., Brooklyn, N. Y.
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Rockwell Furnace Co., New York.

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Pangborn, Thos. W., Company, New York.

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Leiman Bros., New York.
Monarch Eng. & Mfg. Co., Baltimore, Md.
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Turner Machine Co., Philadelphia, Pa.

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Dow Chemical Mfg. Co., Mansfield, O.
Hendricks Brothers, New York.
Leavitt, C. W., & Co., New York.
Richards & Co., Boston, Mass.
Standard Rolling Mills, Brooklyn, N. Y.

NICKEL CASTINGS.
Dow Chemical Mfg. Co., Mansfield, O.

NICKEL SALTS (see also Platers' Supplies).
McKesson & Robbins, New York.

NICKEL SILVER TUBES.
Wells, A. H., & Co., Waterbury, Conn.

OILS, TEMPERING AND LUBRICATING.
McKesson & Robbins, New York.
Swan & Finch Co., New York.

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Paxson, J. W. Co., Philadelphia, Pa.
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PERFORATING, SHEET METAL.
Rochester Perforating Co., Rochester, N. Y.

PHOSPHOR-BRONZE—INGOTS, CASTINGS, ETC.
Ajax Metal Co., Philadelphia.
Clum & Atkinson, Rochester, N. Y.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Globe Metal Co., Chicago, Ill.
Illinois Smelting & Refining Co., Chicago, Ill.
North American Smelting Co., Philadelphia, Pa.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Reeves, Paul S., & Son, Philadelphia, Pa.
Riverside Metal Co., Riverside, N. J.

PHOSPHOR-BRONZE—SHEETS, WIRE, RODS, ETC.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Pilling Brass Co., Waterbury, Conn.
Reeves, Paul S., & Son, Philadelphia, Pa.
Riverside Metal Co., Riverside, N. J.

PHOSPHOR-COPPER.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Lang, R. F., New York.
Reeves, Paul S., & Son, Philadelphia, Pa.
Richards & Co., Boston, Mass.
Roessler & Hasslacher Chemical Co., The, New York.

PHOSPHOR-TIN.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
Lang, R. F., New York.
Malta Metal Co., Rochester, N. Y.
Richards & Co., Boston, Mass.

PHOSPHORUS.
Crescent Phosphorized Metal Co., Philadelphia, Pa.
General Chemical Co., Philadelphia, Pa.

PICKLING MACHINES, AUTOMATIC.
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Schmitz, August, Dusseldorf, Germany.
Torrington Manufacturing Co., Torrington, Conn.

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Kemp, W. H., Co., New York.
Pilling Brass Co., Waterbury, Conn.

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Bennett-O'Connell-Stephens Co., Chicago, Ill.
Burns, E. Reed, Brooklyn, N. Y.
Canning, W., & Co., Birmingham, England.
Cleveland Platers' Supply Co., Cleveland, O.
Detroit Foundry Supply Co., Detroit, Mich.
Dow Chemical Manufacturing Co., Mansfield, O.
Finkell-Hachmeister Co., Pittsburg, Pa.
Hanson & Van Winkle Co., Newark, N. J.
International Chemical Co., Camden, N. J.
Klipstein, A., & Co., New York.
Levett Mfg. Co., Matawan, N. J.
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Miller Electric Co., Newark, N. J.
Obermayer, The S., Co., Cincinnati, O.
Roessler & Hasslacher Chemical Co., New York.
Stevens, Frederic B., Detroit, Mich.
Swan & Finch Co., New York.
U. S. Electro Galvanizing Co., Brooklyn, N. Y.
Zucker & Levett & Loeb Co., New York.

PNEUMATIC COUNTERSHAFTS.
Manufacturers' Equipment Co., Chicago, Ill.

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Atlas Machine Co., Waterbury, Conn.
Leiman Brothers, New York.
Middleditch, Benj., Detroit, Mich.
New Britain Machine Co., New Britain, Conn.
Pfleghar Hardware Specialty Co., New Haven, Conn.

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Ames Sword Co., Chicopee, Mass.

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International Chemical Co., Camden, N. J.
Finkell-Hachmeister Co., Pittsburg, Pa.
Klipstein, A., & Co., New York.
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PRESSES, BENCH AND FOOT.
Atlas Machine Co., Waterbury, Conn.
Baird Machine Co., Oakland, Conn.
Ferracute Machine Co., The Bridgeton, N. J.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

PRESSES, COINING.
Bliss, E. W., Co., Brooklyn, N. Y.
Ferracute Machine Co., The, Bridgeton, N. J.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

PRESSES, DROP.
Atlas Machine Co., Waterbury, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Ferracute Machine Co., The, Bridgeton, N. J.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

PRESSES, POWER.
Atlas Machine Co., Waterbury, Conn.
Baird Machine Co., Oakville, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Farrel Foundry & Machine Co., Ansonia, Conn.
Ferracute Machine Co., The, Bridgeton, N. J.
Garrison, A., Foundry Co., Pittsburg, Pa.
Schmitz, August, Dusseldorf, Germany.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York.

PRESSURE BLOWERS (see also Foundry Supplies).
Leiman Bros., New York.
Monarch Eng. & Mfg. Co., Baltimore, Md.

PYROMETERS.
Bristol Co., The, Waterbury, Conn.
Hoskins Mfg. Co., Detroit, Mich.

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RIVETING MACHINES.
Shuster, The F. B., Co., New Haven, Conn.

ROLL-GRINDING MACHINES.
Farrel Foundry & Machine Co., Ansonia, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

ROLLS, CHILLED AND SAND.
Farrel Foundry & Machine Co., Ansonia, Conn.
Garrison, A., Foundry & Machine Co., Pittsburg, Pa.
Philadelphia Roll & Machine Co., Philadelphia, Pa.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

ROLLS FOR CRIMPING AND CORRUGATING.
Bliss, E. W., Co., Brooklyn, N. Y.

ROLLS, JEWELERS'.
Atlas Machine Co., Waterbury, Conn.
Leiman Bros., New York.
Oliver, W. W., Manufacturing Co., The, Buffalo, N. Y.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

ROLLING MILL MACHINERY.
Atlas Machine Co., Waterbury, Conn.
Farrel Foundry & Machine Co., Ansonia, Conn.
Garrison, A., Foundry & Machine Co., Pittsburg, Pa.
Oliver, W. W., Manufacturing Co., Buffalo, N. Y.
Philadelphia Roll & Machine Co., Philadelphia, Pa.
Schmitz, August, Dusseldorf, Germany.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

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SAND, MOLDING (see also Foundry Supplies).
Pangborn, Thos. W., Company, New York.

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Pangborn, Thos. W., Company, New York.
Paxson, J. W., Co., Philadelphia, Pa.

SAND MIXING MACHINES.
Pangborn, Thos. W., Company, New York.

SAND SIFTERS (see also Foundry Supplies).
Pangborn, Thos. W., Company, New York.
Paxson, J. W., Co., Philadelphia, Pa.
Turner Machine Co., Philadelphia, Pa.

SAWDUST, BOXWOOD, FOR DRYING PURPOSES.
Sommers, John, Son, Newark, N. J.

SAWDUST DRYING-OUT BOXES.
Steiner, E. E., Newark, N. J.

SHEARS, POWER.
Bliss, E. W., Co., Brooklyn, N. Y.
Farrel Foundry & Machine Co., Ansonia, Conn.
Garrison, A., Foundry Co., Pittsburg, Pa.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York.

SHEET METAL STRAIGHTENING, CUTTING AND FORMING MACHINERY.
Atlas Machine Co., Waterbury, Conn.
Baird Machine Co., Oakville, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Farrel Foundry & Machine Co., Ansonia, Conn.
Schmitz, August, Dusseldorf, Germany.
Shuster, The, F. B., Co., New Haven, Conn.
Torrington Manufacturing Co., Torrington, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

SHERARDIZING.
Globe Machine & Stamping Co., Cleveland, O.

SHERARDIZING OVENS.
Gehnrich, Hermann, New York.

SILICON.
Roessler & Hasslacher Chemical Co., New York.

SILICON-COPPER.
Electric Smelting & Aluminum Co., Lockport, N. Y.
Lang, R. F., New York.
Richards & Co., Boston, Mass.
Roessler & Hasslacher Chemical Co., New York.

SILVER INGOTS, BARS, PLATES, ETC.
Renziehausen, Wm. F., Newark, N. J.

SILVER OXYDIZING FLUID.
Carpenter, H. F., & Son, Providence, R. I.

SILVER, ROLLED STERLING.
Jackson, John J., Co., Newark, N. J.
Leach & Garner Co., Attleboro, Mass.
Renziehausen, Wm. F., Co., Newark, N. J.

SILVER TUBES.
Leach & Garner Co., Attleboro, Mass.

SILVER WIRE.
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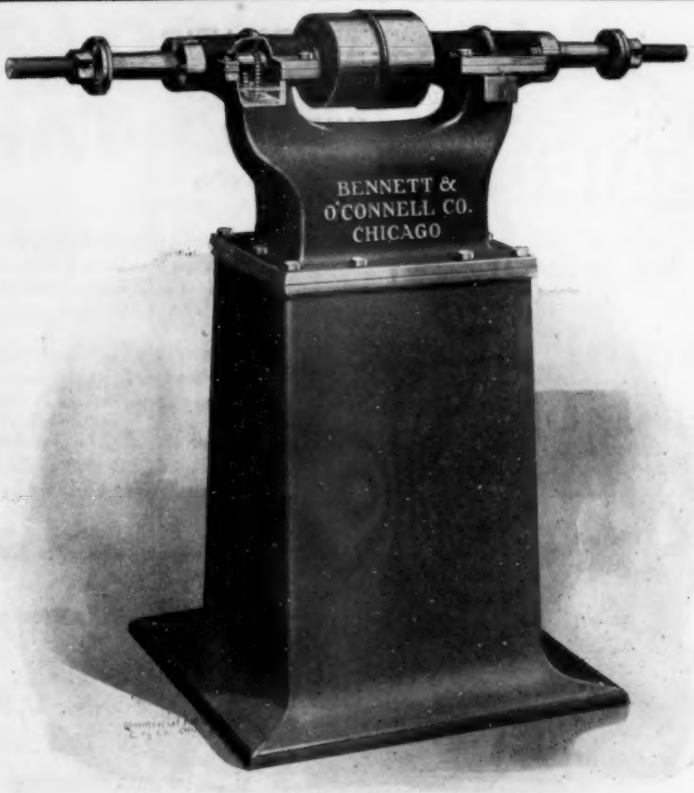

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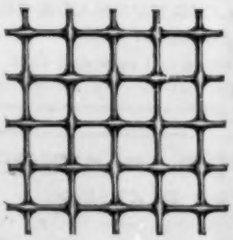

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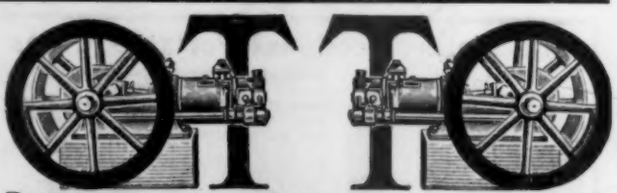

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Respectfully yours,
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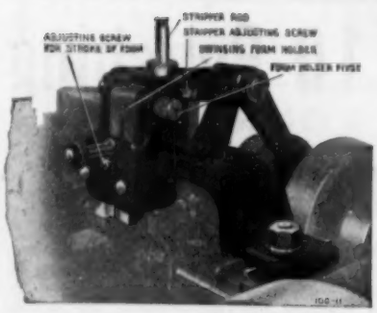

Detail of the Swinging Former

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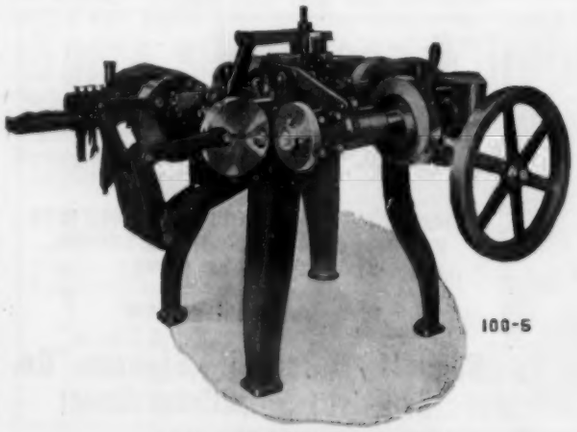
FORMING MACHINERY



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AUTOMATIC FOUR-SLIDE WIRE-FORMING MACHINES

This new form holder has the advantage of allowing the use of either a stationary form, or one swinging about a pivot as shown, in the same supporting bracket.

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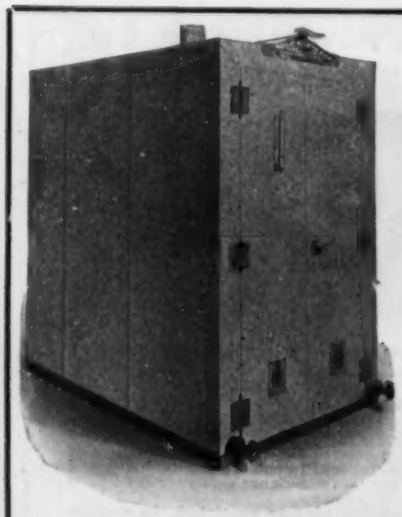

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How it can be remade to original size when worn down?

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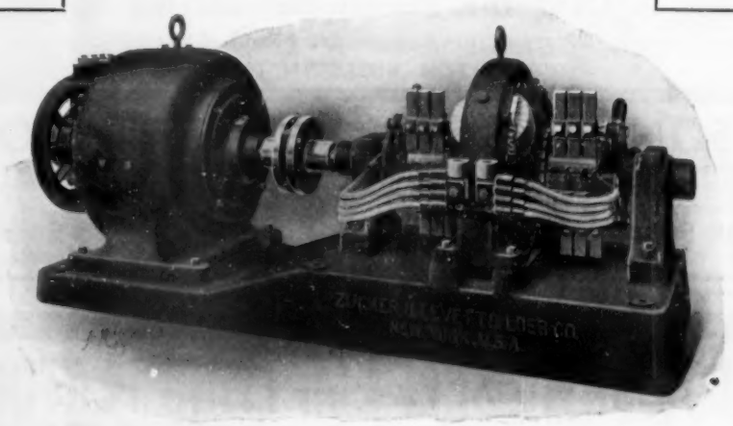

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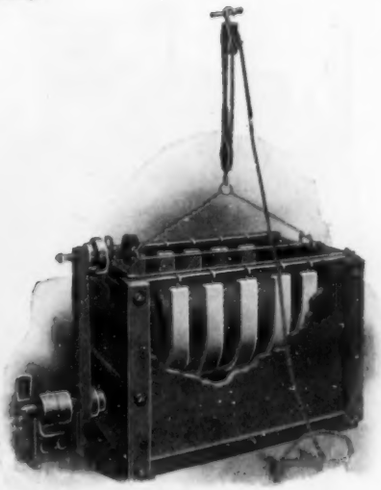

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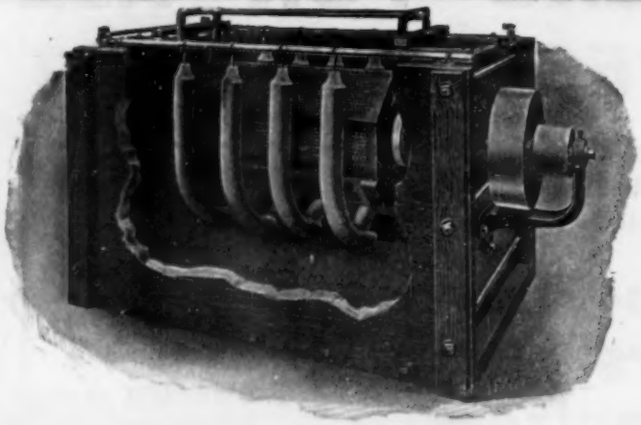

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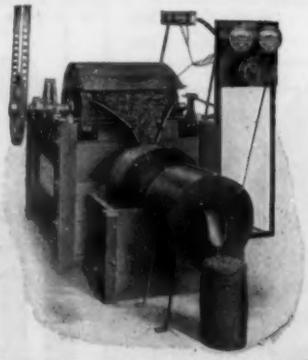

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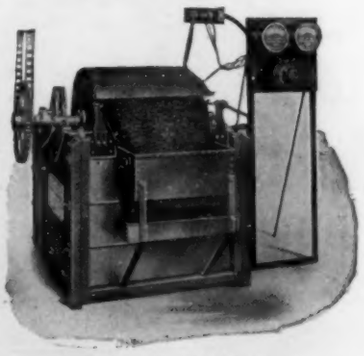

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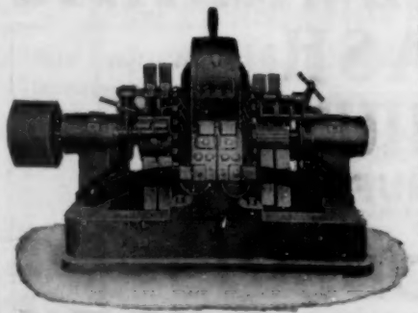

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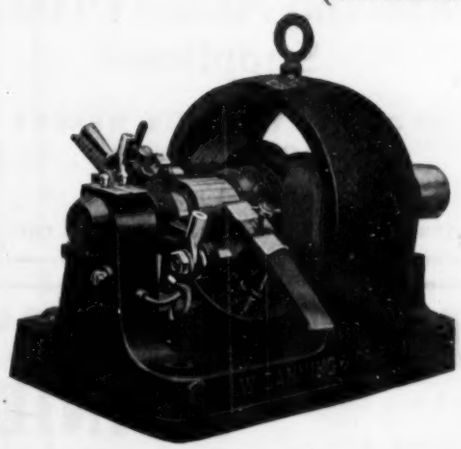

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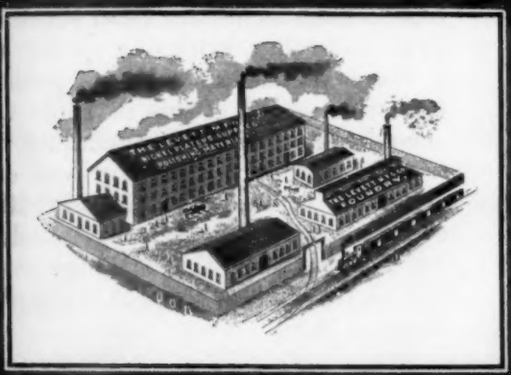

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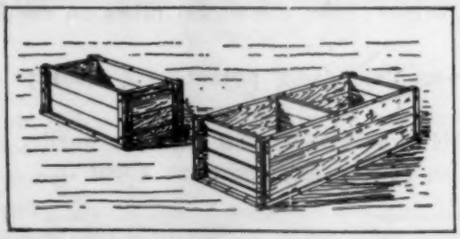

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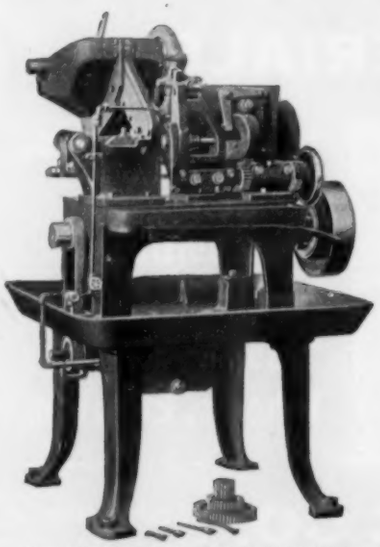

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Our experiments and study preliminary to the designing of this machine were directed toward obtaining accurate work at a rapid rate of production and especial attention was paid to the **rigidity** and output of the slotter. We solicit inquiries regarding this machine as well as descriptions or samples of the work to be done on it.

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AUTOMATIC

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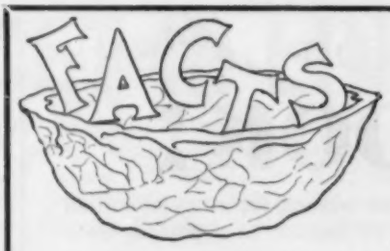

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I manufacture the entire line of buffing compositions and pocket-book quality is their characteristic.

I manufacture FOUNDRY FACINGS and FOUNDRY SUPPLIES, and the quality stamp is on each article. This is an interesting subject. I wish you would write me about it.

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